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[NOTICE.]

January Meeting, New York Section, Illuminating Engineering Society.

The January meeting of the New York Section of the Illuminating Engineering Society will be held the evening of the 12th inst., in the Engineering Societies' Building, at 8:15 o'clock.

There will be two papers treating on the subject of illumination from the ophthalmologist's standpoint, namely: Dr. Nelson M. Black, a prominent oculist of Milwaukee, will present a paper entitled, "Artificial Illumination as a Factor in the Production of Ocular Discomfort." Dr. P. W. Cobb, physiologist, of the physical laboratories, National Electric Lamp Association, will read a paper entitled, "Physiological Points Bearing on Glare."

The third paper, by Dr. J. C. Pole, will treat on some investigations regarding the question of the photometry of mercury-vapor lamps.

[NOTICE.]

Annual Meeting, Illuminating Engineering Society.

The annual meeting of the Illuminating Engineering Society will be held on Friday, January 13th, 1911, at 8 o'clock P.M., in the main dining hall of the Machinery Club, 50 Church street, New York city. An informal dinner at 6:30 P.M. will be served for which a charge of $1.25 per plate will be made. In order that the Committee on Arrangements can make preparations, it is requested that members signify at once whether or not they will attend the dinner.

V. R. LANSINGH, Chairman, Committee on Arrangements.

[NOTICE.]

Annual Meeting, Indiana Gas Association.

OFFICE OF THE SECRETARY, INDIANA GAS ASSOCIATION, INDIANAPOLIS, IND., Dec. 31, 1910.

The annual meeting of the Indiana Gas Association will be held in the Hotel Anthony, Fort Wayne, Ind., Wednesday, January 18th, and Thursday, January 19th.

In connection with this convention, there will be an exhibit of gas appliances, in the "Arcade" in Fort Wayne. Considerable interest is being shown in this exhibit by the manufacturers of lighting, cooking and heating appliances, and there is every prospect that it will be carried through with great success.

PHILMER EVES, Secy.-Treas.

BRIEFLY TOLD.

OBITUARY NOTE, MR. FREDERICK LINES BRADLEY.—A month ago we were constrained to note a sad loss to the fraternity in the death of Mr. Frederick Lines Bradley, who passed away the 4th day of December. He succumbed to an attack of pneumonia that involved both lungs. Born in New Haven, Conn., March 26, 1850, he obtained his early tuition in his native city, and in 1876 he came to New York, where he entered the service of the New York Gas Light Company, acting as Clerk of the Works, which were under the engineering direction of the late Charles C. Mowton. An absorbing mind, active in grasping the details of the work around and about him, his advance [illegible] certain and his worth appreciated. In 1884, when the original plan of consolidation of the various conflicting gas interests was worked out, he was Assistant Superintendent of one of the stations, and the following year (1885) the 99th street station of the Consolidated Company was put in his charge, and in due time his dominion was extended to the control of the old Harlem plant. In these later duties, which at times were of the onerous sort, he made a record that proved his sterling worth to the huge corporation as a whole. This brief sketch of his active business career shows a continuous connection of activity in the gas supply of New York, a connection that was carried out with increasing credit to his capacity as an engineer and to his faithfulness to his superiors during a period to all intent numbering 35 years. He was a charter member of the American Gas Institute (coming to that body through many years of membership in the American Gas Light Association), and had answered to roll call in the Society of Gas Lighting since 1892. He was also a valued member of the Society of Gas Engineer-

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ing, New York city. Other bodies with which his name was officially connected, are, "The New England Society;" the "Society of Colonial Wars," and the "Sons of the Revolution." On June 17, 1879, he was united in marriage to Miss Arabella T. Randolph, of this city, who survives him. Prominent in the surviving next-of-kin is a brother, Mr. William H. Bradley, Engineer-in-Chief of the Consolidated Gas Company. Deceased, while never of a demonstrative nature, was animated by as kindly a heart as ever beat in human frame, and the record of his useful life reveals the story of example well given, of work well done.

A STUDY OF LUMENS.—The paper on "The Lighting and Ventilation of Gas Appliance Display Rooms," by Mr. Thomas Scofield, which is completed in this issue, is interesting as far as the lighting is concerned, inasmuch as the like ground was gone over by Mr. V. R. Lansingh, who laid out the installation described in an earlier paper, which appeared in the JOURNAL, January 3, 1910. However, Mr. Scofield's treatment of the subject is of the kind well calculated to cause others to take it up. We congratulate him on the story as he tells it, and we hope, now that Mr. Scofield has made his appearance in the paper arena, that he will be soon again heard from. Both papers contain data as to the illumination proper, and as these vary so widely it may be worth while to republish them:

Lumens per Cubic foot of Gas.	Lansingh.	Scofield.
First floor	87.5	70.13
Third floor	92.1	51.207

The figures of Mr. Lansingh show an installation efficiency of over 50 per cent. for both floors, while those of Mr. Scofield range from 30 to 40 per cent. The importance of the use of lumens, as used quite generally, may be questioned; and in this case it is unfortunate that more discussion was not had upon the points mentioned.

CURRENT MENTION—

"Q. R. V.," writing from Louisville, Ky., under date of the 27th ult., says: "This week a notable happening in New Albany was the celebration of the golden wedding of Mr. and Mrs. Nicholas Melmer, who were married Christmas day, in St. Mary's Catholic Church, New Albany, 1860. At the time of his marrage 'Nick.' Melmer was in the employ of the New Albany Gas Company, and he is still in harness in the employ of the United Gas and Electric Company, of the same city."

VICE-PRESIDENT WALSH, whose intelligent management of the affairs of the New York and Richmond Gas Company, Borough of Richmond, N. Y., has kept its increasing business going, with satisfaction to its customers and with profit to its owners, has authorized Treasurer Fielis to announce that hereafter the net selling rate shall not exceed $1 per 1,000 cubic feet.

THE South Side Board of Trade, Brooklyn, N. Y., at a special meeting held some evenings ago, which was largely attended and at which the subject was thoroughly discussed, the Board's Counsel (Mr. Herbert Reeves) was authorized to accept the proposition submitted by the Kings County Lighting Company. The compromise measure agreed to is this: The current rate ($1 per 1,000 cubic feet) is cut to 90 cents, which rate is to be effective until January 1, 1913; the rate to be 85 cents from then until January 1, 1915; thereafter, or until January 1, 1917, 80 cents per 1,000. While the average rate over the period is undoubtedly a low one, both sides to the controversy are to be congratulated on their good sense in giving and taking, rather than dragging the matter to tiresome length and in expensive worry through the usual court proceedings.

THE Public Service Commission, up-State division, has authorized the Utica (N. Y.) Gas and Electric Company to issue $500,000, par value, of its remaining unissued $2,000,000, 5 per cent. 50-year gold bonds, the proceeds to be used for the dischage of an indebtedness incurred on account of construction and extensions of plant. The bonds may be sold at not less than 95.

ALL the properties of the Seymour (Ind.) Gas and Electric Light Company were sold at Sheriff's sale the morning of the 28th ult. The purchaser was Mr. Frank R. Grover, Chairman of the Committee of Bondholders, at his bid of $20,000.

MR. HAROLD S. SCHUTT, Manager of the Wilmington (Del.) Gas and Electric Company, has informed the residents that, beginning the 1st inst., the net gas rate will be at 95 cents per 1,000 cubic feet.

LAST month an initial dividend of 3 per cent. was declared on the preferred stock of the Welsbach Company, which corporation was organized in 1900 to take over the Welsbach Light Company and the Welsbach Commercial Company.

THE plant and franchises of the Madison (Ind.) Lighting Company were sold at auction the 30th ult. to the bondholders, at their bid of "$15,000, over all." Mr. Theodore H. Durat will likely be the active man at Madison, until the final organization is a matter of fact.

CITY ATTORNEY ROBERT O. BRENNAN, of Des Moines, Ia., is complacently contemplating the likely effect of the proposed ordinance which it has arranged for the future government of the Des Moines Gas Company. In this instrument the net rate is put at 95 cents per 1,000 cubic feet; the minimum candle power is put at 22; and it is also specified that the Company shall pay into the city treasury 2 per cent. of the yearly gross receipts. The crowning infamy of the measure, however, is in the paragraph which specifies that any charging for gas in excess of the rate named in the franchise subjects the officers of the Company to the committing of a misdemeanor, the maximum penalty for which is a $100 fine and a period of 30 days in jail. Could there be greater evidence of municipal protectionism gone crazy than this?

THE Governor of Rhode Island, whose name once memorized should never be forgotten, in that it is Aram J. Pothier, and it must be well known to the people of Rhode Island, since the gentleman is now serving his third term as Governor of the "Tidy Little State," is evidently changing his views over matters that appeal vitally to the people who are producers. When he first assumed office he asserted, in season and out, that the commerce of a State should be protected, whence ordinary reasoners thought that those who had large or small sums invested in "commercials" might share the good flowing from such protection. However, time changes, and with the changes come somersaults on the part of the politicians who could ride the crests of the waves—be the latter of reform, reversal or revolution. To show that the Hon. Aram J. Pothier's beliefs have changed, in respect of commercialism at any rate, would seem to be proved by citing, from the inaugural message, his recommendation that "This General Assembly enter upon a serious and thorough consideration looking to the enactment of a law creating a State Board of Public Utilities, with powers of supervision over * * * gas, electric light and power companies. * * *

MR. B. H. PETLEY, of Seattle, Wash., has been appointed representative of the Gas Bench Construction Company, in the States of Oregon, Washington and Idaho, and the District of British Columbia. Mr. Petley was Superintendent of the Seattle Gas Company for a number of years, and although for some time back he has been actively engaged in the practice of civil engineering, his paths in such connection have never been at any considerable angle to the roads of the gas industry. In which event he may be safely counted as being "on the job" for any benchwork that may be in or on the market in his territory.

MRS. SARAH E. WOODWORTH CRAIG has completed a most successful tour, during which she gave many lectures and demonstrations in the field of cooking with gas. Most of her work was done in Georgia and North Carolina, and it was concluded in a 2 weeks' term with "The McAlpine Company," of Cincinnati, which brought her home in time to enjoy the holiday season. The accomplished lady is now teaching a class at the Military Post, Kentucky Highlands, in which rather romantic region she is showing the wives of "Uncle Sam's" soldiers how to cook, in order that they may be properly fed.

Publications.

The Coke Industry of the U. S.—The Bureau of Mines, Department of the Interior, Washington, D. C., have recently issued Bulletin No. 3, entitled, "The Coke Industry of the United States," as related to the foundry, prepared by Mr. Richard Moldenke. It covers the subject in a terse and readable manner, and in addition a list of publications on fuel testing is appended. Copies may be had by writing to the above address.

Special Libraries.—Paper entitled, "What are Special Libraries," by Louise B. Krause, Librarian, H. M. Byllesby & Co., read before Illinois Library Association.

Annual Report, Department of Electricity, City of Chicago, Ills., 1909.—Operations covering gas as well as electric lighting, meter testing, etc.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

979,652. Gas Connection for Outlet Boxes. L. H. Church, Stamford, Conn., assignor to the Standard Electric Fittings Company, same place.
979,734. Gas Burner. A. Beler, Pittsburgh, Pa., assignor to Beler Water Heater Company, same place.
979,742. Inverted Mantle Burner. R. H. Bruckner, Mount Vernon, N. Y.
979,761. Carbureter. D. H. Haywood, New York City, assignor, by mesne assignments, to American Gas and Power Company.
979,818. Method of Making Producer Gas. W. O. Amsler, Pittsburgh, Pa.
979,855. Inverted Incandescent Gas Lamp. A. J. Hofmann, Newark, N. J.
979,951. Gas Producing Furnace. R. Hilprecht, Lansing, Mich.
980,004. Coke Drawer. A. H. Reeder, Stonega, Va.

[Official Report—As Appoved by Committee on Publication.—Continued from Page 11.]

THE FIFTH ANNUAL MEETING, AMERICAN GAS INSTITUTE.

Held in New York City, October 19th to 21st (Inclusive), 1910

Second Day—Morning Session.

THE LIGHTING AND VENTILATION OF GAS APPLIANCE DISPLAY ROOMS.—*Continued.*

From the pantry, we go to the last room of the apartment, the kitchen (Fig. 15). Like the pantry, it is completely equipped with all

Fig. 15

the accessories needed in the culinary art, and also, like the pantry, it shows the correct method of illumination. It seems to be the usual tendency to spend most of the thought and time on the lighting of the other rooms of a house, and the kitchen seems to be left to its own devices, a central single light fixture generally being provided for all the work. For the general lighting of this room there is a central 2-light reflexolier, with holophane clear distributing reflectors, and the special illumination is taken care of in the following manner: Under the hood of each of the ranges here installed, is a swinging wall bracket, carrying a reflex light with white porcelain cone reflector. These brackets can be moved around at will, directing their light on any portion of the stove top where a cooking operation is underway. Over the tables and the sink are side brackets, with the same equipment, making it possible to work in any part of the room without having one's shadow cast over the work. Aside from the bad effects on the eyes, of anyone working in a poorly illuminated kitchen, all our food is prepared in this room, which we endeavor to keep as clean as possible. Therefore, does not a deficiency of light defeat the very result for which we are striving?

The third floor is occupied by the offices of the General Fuel Appliance Department, and offers an illustration of modern office lighting A few years ago the approved method of office lighting was by individual lights on each desk, with perhaps some general illumination. Shortly after the tungsten unit was developed by the electric interests, they evolved a system of uniform illumination from evenly distributed small units or sources of light. This proved a success, supplanting the individual desk lights and reducing the severe eye strain so often developed through poor adjustment of the same. They called this the "distributed unit system." On the third floor of this building is installed and in operation the first distributed unit system, using gas as the illuminant. (Fig. 16.) As the building was not piped for any such conditions, and as ripping out the ceiling for the purpose of running the piping was not only inconvenient, but would have constituted a great handicap for the installation of like system in buildings already in use, a method was devised for using the old outlets in the ceiling. The pipe was run, as required, along the ceiling and then covered over with a decorative molding, matching the cornice of the ceiling. This gave the ceiling a paneled effect, very pleasing to the eye as a decorative addition. A section of the molding is shown with its main central groove for the pipe, and its two smaller side channels for either electric wires or pneumatic tubes, depending

Fig. 16.

entirely on the system of ignition used. Twenty-six outlets were left on this floor, each having a single reflex pendant, with clear inner cylinder and satin finish holophane distributing reflector. The lights are controlled on a pneumatic system, each button on the wall taking 2 lights in the front of the floor, and 3 at the rear, with the 3 lights in the extreme front bay controlled separately. The installation has been in constant operation for over a year and the bookkeepers, most of whom work under the artificial light continually, have found it very efficient. The rear portion of this floor was divided into 4 equal rectangles, one of which was again sub-divided into 18 smaller and equal rectangles, at the center of each of which a test station was established (Fig. 17). No adjustment was made of the system, excepting that due to the regular maintenance. Horizontal readings of illumination were taken at each station, several readings being used at each, to avoid as far as possible the personal error, and the average of all the 18 stations was taken as the average illumination of the room. Pressure and consumption were also read, as on the first floor. The results follow:

Third Floor.—*Observed Horizontal Illumination Values.*

Station Line 1-6.	Foot-Candles.	Station Line 7-12.	Foot-Candles.	Station Line 13-18.	Foot-Candles.
1	1.220	7	1.548	13	1.611
2	2.013	8	2.160	14	2.598
3	2.328	9	2.370	15	2.945
4	2.525	10	2.728	16	3.260
5	2.640	11	2.995	17	3.478
6	2.948	12	3.093	18	3.190

Maximum dimensions of the floor	84′ 0″ by 22′ 0″
Height to ceiling	10′ 0″
Height to mantles	8′ 10″
Height to test plane	2′ 9″
Height mantles above test plane	6′ 1″
Number of outlets	26.0
Number of burners per outlet	1.0
Total number of burners	26.0
Distance between outlets	8′ 0″
Total gas consumption, cubic feet per hour	83.2
Average consumption per burner	3.2
Pressure, inches of water	1.8
Total area of floor, square feet	1,680.0
Cubic feet gas per square foot, entire floor	0.490
Number of test stations	18.0
Average foot-candles	2.536
Lumens per cubic foot of gas	51.207

The curves (Fig. 18) show graphically the observed illumination, and also bring out the great uniformity obtained, the greatest divergence between the mean illumination and any of the 18 stations being only 51.89 per cent., and this occurred at station No. 1, at the extreme corner of the room.

The fourth floor (Fig. 19), also an office floor, used for the canvassers as a general meeting place and for general offices, is lighted by nine 4-light reflexoliers, equipped with clear inner cylinders and Verre-Krasna globes, each controlled by a single button on the pneumatic system. Here no attempt has been made for uniformity of illumination, as the curves of the observed illumination show. The same corresponding test stations were established as used on the floor below, and the test carried out in a similar manner with the following results:

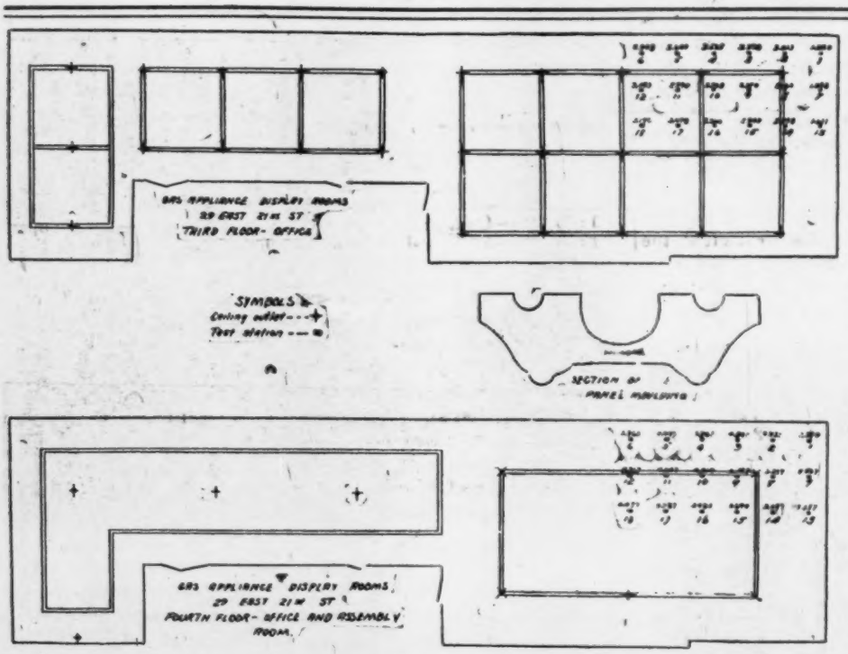


Fig. 17.

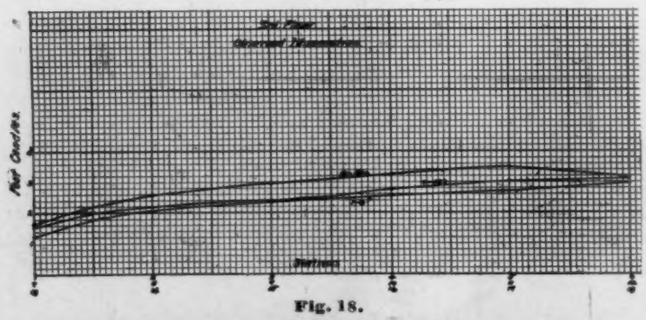


Fig. 18.

Fig. 19.

FOURTH FLOOR.—*Observed Horizontal Illumination Values.*

Station Line 1-6.	Foot-Candles.	Station Line 7-12.	Foot-Candles.	Station Line 13-18.	Foot-Candles.
1.....	2.390	7	2.537	13	2.227
2.....	3.923	8	5,227	14	3.607
3.....	4.803	9	6.197	15	3.640
4.....	3.863	10	4.017	16	3.483
5.....	4.497	11	4.647	17	3.587
6	5.963	12	8.717	18	4.477

Maximum dimensions of floor	84′ 0″ x 22′ 0″
Height of ceiling	10′ 0″
Height to mantles	8′ 0″
Height to test plane	1′ 9″
Height of mantles above test plane	5′ 3″
Number of outlets	9
Number of burners per outlet	4
Total number of burners	36
Total gas consumption, cubic feet per hour.	115
Average consumption per burner	3.194
Pressure inches of water	2.0
Total area of floor, square feet	1,680
Cubic feet of gas per square feet of floor	0.068
Number of test stations	18
Average foot-candles	4.294
Lumens per cubic foot of gas	63.73

The greatest deviation from the mean on this floor occurs at Station No. 12, where we have 8.717 foot-candles, or a difference of 103 per cent., as against 51.89 per cent. on the third floor (Fig. 20).

The fifth floor of the building is devoted to general offices of the Fuel Appliance, New Business and Illuminating Engineering Departments, and to experimental lighting apparatus.

The necessity of ventilation for the apartment on the second floor was very great, for here the rooms, being laid out on an ordinary loft floor, had no direct communication with the outside air, excepting in the case of the extreme front and rear rooms. Again, as all the floors are of considerable size, and the office force large, good, clean, pure air was essential for the comfort and health of all working in the building. Two ventilating systems, therefore, have been installed, one which takes care of the basement and the appliances, the appliances in the store, and the two ranges in the kitchen of the apartment on the second floor, and the other, which takes care of the second, third and fourth floors. The fifth floor, having direct ventilating facilities by means of skylights to the roof, has had no artificial ventilation provided. The system for the basement is laid out as follows:

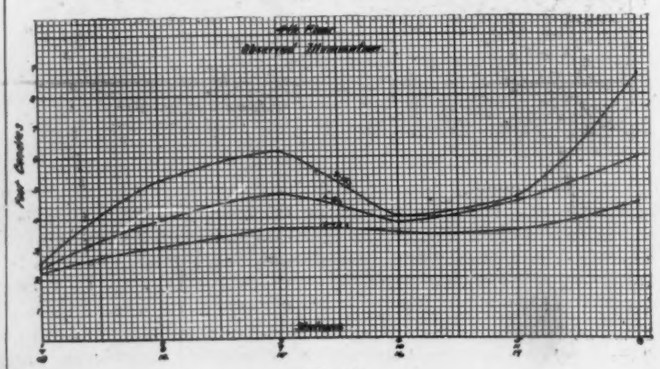


Fig. 20.

A 10-inch, galvanized iron, round-duct is run along the west wall near the ceiling and across the rear wall to the easterly window, where it joins another similar 10-inch duct, running the length of the east wall. These ducts have 6-inch diameter openings, spaced approximately every 7 feet of their run, making a total of 18 of these openings. Each of these is provided with a damper so that, whether being used as a flue for an appliance or for general ventilation of the room, they can be regulated at will. In addition to these eighteen 6-inch openings, 3 registers, 6 inches by 12 inches, have been left in the 10-inch ducts for general ventilation, and these are all fitted with dampers. The two 10-inch ducts join at the easterly window, and form a 14-inch round-duct which rises to the roof. Into this 14-inch riser runs a 6-inch by 6-inch connection which provides ventilation for the appliances in the store, and an 8¼-inch diameter connection, which takes the two 6-inch diameter ducts from the ranges in the apartment kitchen. This riser terminates about 15 feet above the roof in a revolving ventilating cap, natural draft being used for this system. However, in case mechanical draft should become necessary, this riser has a by-pass, on the roof, in which is located a motor-driven fan. In order to prevent the fan from simply drawing air through the ventilating cap and down-and-out through the by-pass, an automatic system of valve regulation in the riser and by-pass was devised. A governor on the shaft of the fan operates, through a system of levers, a butterfly valve, placed at the point where the by-pass joins the riser. This valve at one extreme position shuts off the

riser just above the by-pass and at the other extreme position shuts off the by-pass at its intersection with the riser, leaving the latter open. Whenever the fan is started then, this valve closes the riser, insuring all the air, being exhausted, to pass through the fan only. When the fan is stopped the valve closes the by-pass, and the ventilation is done via the ventilating cap. The fan is an 18-inch disk-fan and has a capacity of 1,200 cubic feet per minute.

For ventilation on the 2d, 3d and 4th floors, a motor-driven fan was installed on the roof and connected directly with the air shaft of the building. This is a 36-inch disk fan with a capacity of 6,500 cubic feet per minute. From this air shaft ducts are run to the different rooms on the second floor, terminating in registers set in the walls near the ceiling.

Room or Floor.	Register Area. Sq. Ft.	Observed Velocity Outgoing Air, Ft. per Minute.	Quantity in Cu. Ft. per Hour.	Cubic Contents of Room.	Number Changes per Hr.
Butler's pantry	0.370	243	5,394.60	953.25	5.65
Dining room	0.444	211	5,621.04	2,472.81	2.27
Library	0.889	404	21,549.36	2,460.00	8.76
Corridor	0.889	446	23,789.64	2,788.00	8.53
Bath room	0.444	327	8,711.28	992.97	8.78
Third floor	1.334	1,020	81,640.80	17,068.80	4.78
Third floor toilet	0.139	754	6,288.36	311.75	20.17
Fourth floor	1.334	1,075	86,043.00	17,068.80	5.04
Fourth floor toilet	0.139	845	6,793.80	357.50	19.00

The butler's pantry has 1 register, 10 inches by 8 inches; the dining room a 12-inch by 8-inch register; the bath room a 4-inch by 24-inch; the library an 8-inch by 24-inch; and the color booth No. 3, in the corridor, for the purpose of ventilating the corridor, a 12-inch by 16-inch register. The third floor has one large register, 12-inch by 24-inch, and a smaller register in the toilet, 5-inch by 6-inch. This layout applies also to the fourth floor. Tests made with a standard anemometer at the different register faces show the preceding results.

The above table shows the quantity of air handled, but does not give any indication of the purity of temperature of the average air in the rooms in the apartment, or on any of the other floors. To determine this a series of tests was run for the determination of the temperature, humidity, amount of CO_2 and the amount of oxygen present on each floor. These tests were made with the lighting installation on each floor in operation, and the ventilating system also in operation, the whole test taking place during ordinary business hours. As a comparative test the same determinations were made on the fifth floor where no gas except that used in the pilots of the 7 lights had been burned for 16 hours, and where the only persons on the entire floor were the two experimenters. In running this test 2 stations were established, at each of which 2 samples of air were taken, 1 at the ceiling and 1 at a level of 5 feet 3 inches above the floor, this being assumed as a fair average figure for the head height; or, in other words, the height of the stratum of air which surrounds the breathing organs. Temperatures and humidity were taken at the same stations that the samples were, and also samples of air from the outside at both the beginning and ending of the test with their temperatures and humidity. The samples of air were analyzed for CO_2 and oxygen. The instruments used were the Petterson-Palmquist CO_2 apparatus, the Elliott pyro-oxygen apparatus, and an Assman aspiration psychrometer. The fifth floor test resulted as follows:

FIFTH FLOOR.

Time.	Station.	Percentage CO_2.	Percentage Oxygen.	Temperature Degs. C.	Humidity Grains H_2O in 1 Cubic Foot.	Remarks.
1:45 P.M.	—Outside	0.0400	20.9	2.7	1.850	....
2:15 "	—Ceiling	0.0675	20.8	14.8	2.007	....
3:00 "	—5′3″ level	0.0650	21.0	13.8	2.258	....
3:35 "	—Ceiling	0.0700	21.0	15.4	2.139	....
4:00 "	—5′3″ level	0.0700	21.0	13.8	2.135	....
4:30 "	—Outside	0.0375	21.0	3.4	1.859	....

From this it is evident that the oxygen and CO_2 in the air, both at the ceiling and at the 5-foot 3-inch level, were very nearly the same inside as outside.

On the fourth floor three stations were established, and samples and temperatures taken as described before. During this test, the full lighting installation of nine 4-light reflexoliers was in operation, having been lighted at 9 A.M., and the floor was occupied by six persons continually, the two making the test only being there while taking samples. The ventilating fan was in operation during this test, as in all subsequent tests given. The gas consumption on this floor during the tests was 120 cubic feet per hour. The results follow:

FOURTH FLOOR.

Time.	Station.	Percentage CO_2.	Percentage Oxygen.	Temperature Degs. C.	Humidity Grains H_2O in 1 Cubic Foot.	Remarks.
9:30 A.M.	—Outside	0.0360	20.9	7.4	2.879	Ventilating fan in operation.
10:35 "	—Ceiling	0.0800	21.0	24.6	3.388	
11:00 "	—5′3″ level	0.0825	20.9	23.4	3.433	
11:40 "	—Ceiling	0.0800	20.9	25.0	3.249	
12:15 P.M.	—5′3″ level	0.0750	20.8	23.1	3.562	
1:00 "	—Ceiling	0.0800	20.9	25.8	3.500	
1:10 "	—5′3″ level	0.0800	20.9	24.0	3.649	
2:00 "	—Outside	0.0400	21.0	10.4	3.125	

From these figures it can be seen that the increase in CO_2 in the inside atmosphere over that in the outside is entirely negligible; that the oxygen remains the same, and that the difference in the humidity is very slight. These can be considered perfect conditions as regards ventilation, as the increase in CO_2 can be more than accounted for by that given off by the occupants of the room.

The tests on the third floor were similar to those on the fourth. The full equipment of 26 reflex lights was lighted at 9 A.M., giving a gas consumption of 85 cubic feet per hour, and the usual clerical force of 15 was continually in the room, while the two testers were present only while taking samples. The results follow:

THIRD FLOOR.

Time.	Station.	Percentage CO_2.	Percentage Oxygen.	Temperature Degs. C.	Humidity Grains H_2O in 1 Cubic Foot.	Remarks.
10:45 A.M.	—Outside	0.0400	20.9	5.4	1.893	Ventilating fan in operation.
11:15 "	—Ceiling	0.0900	21.0	27.0	2.813	
11:55 "	—5′3″ level	0.0850	20.9	22.4	2.677	
2:35 P.M.	—Ceiling	0.0800	20.9	27.2	2.785	
3:00 "	—5′3″ level	0.0800	21.0	23.6	2.704	
3:54 "	—Ceiling	0.0900	20.9	27.0	2.945	
3:55 "	—5′3″ level	0.0925	20.9	24.0	2.629	
4:25 "	—Outside	0.0400	21.0	5.2	1.821	

Here again the increase in CO_2 is very slight, and can be more than accounted for by that given off from the occupants of the room; the oxygen is constant and the humidity but slightly higher, while the temperatures at the ceiling and 5 feet 3 inches level are practically the same, the greatest difference being 3.6° C.

The second floor presented a different proposition. One station was established in each room at as nearly an average position as possible, in reference to the lighting fixtures and the ventilating registers. During the tests the following lights were burning, having been started at 9 A.M. Reception room, 7 reflex; corridor, 3 reflex, and single reflex in each of booths Nos. 1 and 5; library, 1 reflex in center dome; 3 Ramsdell, bijou inverted burners; 2 Welsbach Juniors in mantle standards, and one large Welsbach in portable lamp. Dining room, center dome with 4 small, upright Welsbachs and 2 side brackets, with a Welsbach Junior in each; bathroom, 2 side brackets, with Welsbach Juniors, and kitchen, all the fixtures, making a total of 6 reflex, and giving a grand total gas consumption of 146 cubic feet per hour. The number of occupants of the apartment during the test was three, with the two making the test only in the rooms while taking samples. The results follow:

SECOND FLOOR.

Time.	Station.	Percentage CO_2.	Percentage Oxygen.	Temp. Degrees C.	Humidity Grains H_2O in 1 Cu Ft.	Remarks.
9:30 A. M.	Outside.	0.0400	21.0	3.8	1.999	Ventilating fan in operation
	Reception room.					
10:05 A. M.	Ceiling	0.0800	20.9	39.2	2.128	
10:35 "	5′3″ level	0.0850	20.9	22.4	2.374	
	Booth No. 1.					
11:10 "	Ceiling	0.1600	20.9	44.0	3,579	
11:40 "	5′3″ level	0.0800	20.9	25.7	2.673	
	Corridor.					
12:05 P. M.	Ceiling	0.1250	20.9	44.0	2.722	
12:30 "	5′3″ level	0.0975	20.9	21.6	2.479	
	Bath-room.					
2:20 "	Ceiling	0.0975	20.9	27.2	2.597	
2:50 "	5′3″ level	0.0850	20.9	21.4	2.686	
	Library.					
3:30 "	Ceiling	0.0875	20.9	30.4	2.592	
4:00 "	5′3″ level	0.0775	20.9	22.6	2.775	
	Dining room.					
4:10 "	Ceiling	0.1475	20.8	35.0	2.677	
4:50 "	5′3″ level	0.0900	20.9	23.8	2.804	
	Kitchen.					
5:00 "	Ceiling	0.0850	20.9	34.4	3.166	
5:45 "	5′3″ level	0.0825	20.9	22.2	3.249	
5:55 "	Outside	0.0325	21.0	9.0	2.309	

From these results it can be seen that on this floor where the conditions for natural ventilation are extremely poor, in fact where,

excepting in the reception room and the kitchen, there is absolutely no means of natural ventilation, that in no case is the increase of CO_2 sufficient to vitiate the air, while the oxygen is practically the same as in the air outside, and the humidity is but very slightly higher, even after 8 hours of continuous run. The CO_2 found in Color Booth No. 1 at the ceiling, is necessarily high, for the formation of this booth makes the top a pocket which nothing short of a direct current of air would influence. This is also true in a lesser degree of the corridor and dining room.

The store floor presented again different conditions as to occupants and direct connection with the outside atmosphere. Here the entire lighting installation of 28 reflex lights was put in operation at 7 A. M., and 6 reflex lights in each window were lighted at 2:15 P.M. During the tests there were 4 persons in the store continually, and a total of 30 customers whose stay varied from 5 to 20 minutes. Each time a customer entered the store meant an opening of the door and, therefore, a direct communication with the outside air. The 6 persons making the test were only in the store while taking samples. The gas consumption during the tests was 110 cubic feet per hour. The results follow:

FIRST FLOOR.

Time	Station.	Percentage CO_2.	Percentage Oxygen.	Temperature Degrees C.	Humidity Grains H_2O. in 1 Cubic Feet.	Remarks.
10:00 A. M.	Outside	0.350	20.9	10.6	3.273	....
10:35 "	Ceiling	0.0450	20.9	23.2	3.467	....
11:10 "	5'3" level	0.0450	21.0	17.0	3.411	....
11:45 "	Ceiling	0.0525	20.9	23.8	3.292	....
12:15 P. M.	5'3" level	0.0475	20.9	18.2	3.523	....
1:50 "	Ceiling	0.0450	21.0	25.6	3.303	....
2:25 "	5'3" level	0.0450	21.0	18.4	3.901	....
3:05 "	Outside	0.0375	21.0	11.0	3.637	....

This floor, as the results of the test show, has the same air conditions, with the exception of the temperature, as are found outside. The basement air was tested in the same manner as the previous tabulated floors, samples being taken at the ceiling, and head level at three stations. The arc lamps were lighted at 7 A.M., and burned constantly during the test, giving a gas consumption of 140 cubic feet per hour. The only occupants of the floor while the test was being run were the 2 who were making the same, and the ventilating system, using the motor-driven fan, was in operation, with 3 large registers and 9 of the 6-inch diameter ports open. The results were:

BASEMENT.

Time.	Station.	Percentage CO_2.	Percentage Oxygen.	Temperature Degree C.	Humidity Grains H_2O in 1 Cu. Ft.	Remarks.
10:45 A.M.	—Outside ...	0.0300	21.0	2.0	1.488	Ventilating system in operation.
11:35 "	—Ceiling....	0.1600	20.8	21.8	2.454	
12:25 P.M.	—5'3" level..	0.1000	21.0	20.6	2.428	
2:30 "	—Ceiling....	0.1150	20.8	26.4	2.766	
3:10 "	—5'3" level..	0.0900	21.0	21.0	2.381	
3:40 "	—Ceiling....	0.0800	20.9	28.2	2.470	
4:00 "	—5'3" level .	0.0800	20.9	21.1	2.313	

These results show a negligible increase in CO_2 and practically no change in the oxygen, with a slight increase in the humidity; or, in other words, good, pure air.

With this consideration of the ventilation, and related closely to it, is the subject of heating. This building is equipped with direct steam radiation, the steam being supplied by a gas boiler located in the basement. This boiler does away with all dirt and dust attendant on the handling of coal and ashes, and the boiler itself occupies only about one-third the floor space that the coal boiler, which it displaced, occupied. Again, through a system of thermostats on all floors, and through the automatic regulation on the boiler itself, as nearly mechanical a regulation as possible is secured. The thermostats are set at the temperature desired to be maintained, and when this point is exceeded the radiator valves are closed. This causes a rise of steam pressure at the boiler, which, when it reaches the point at which the mechanism is set, reduces the gas supplied to the burners. As soon as the pressure drops, due to the radiators being opened by the thermostats, the gas is increased on the burners. Thus a complete and most economical system of automatic control is secured, the boiler only burning enough gas to supply the actual steam needed to keep the temperature of the building at the desired point.

The building here described is completely equipped with gas, using it for lighting and heating, for hot water supply, and for demonstrating the various appliances. The building has every improvement and recent development in all branches of the gas appliance and lighting fields, not only on demonstration, but in actual operation. The lighting installations have been in constant operation for over a year, and show on the tests cited both efficiency and economy. The ventilation is practically perfect, the air being as fresh and as pure as the outside atmosphere. This demonstration so attractively and effectively fitted out should go a long way to overcome the prejudice, which still exists in some minds, against the use of gas for lighting or heating.

Discussion.

Mr. Macbeth—Mr. President and Gentlemen: It would be a very good thing indeed if more gas companies had such showrooms as we had here described. We constantly hear talk of the depreciation in gas illumination and its shortcomings. When you look back over the field you can hardly blame the consumer to-day for using fewer gas lamps and more of the electric. The consumer's judgment has been largely influenced by the open flame burner, and there are so few gas offices where they show what really can be done with gas illumination. I have been through a number of showrooms at different times and have observed what visitors to these rooms had to say about certain lamps, and many times I have heard the remark: "You mean to tell me that these results are secured with gas lamps; that this is gas you are using here?" When you remember how old the gas business is, and consider how few showrooms there are in this country, and that these or similar rooms have not been open to the public for 70 years, or even 10 years, and most of them for 1, 2 or 3 years, you can readily understand many of the so called disadvantages of the gas business. There are commendable points in this paper that can be very easily adapted to any gas showroom with advantage. Take the color booths, shown and illustrated on page 14. I do not know of a more practical and forceful demonstration for the average consumer than to look over this color booth and note the effect with various colorings on the walls and the resultant illumination on that table. There is one point I should like to bring out here in connection with the table shown on page 15, giving the percentages of the illumination values with these various colored walls. It has not been stated that these values represent the coefficients of reflection of these colors, but it is possible that in reading the table over hurriedly some members might conclude that the values were representative. With this small room, 4 feet by 5 feet, with the lamps equipped with reflectors, directing 90 per cent. of the light downwards from a point approximately 5 feet above the table, a considerable part of the light received on the disk of the photometer at the table height would be direct from the lamp; however, had the bottom of the lamp been screened in such a manner as to cut off all direct light, then the light received on the photometer screen would be that reflected from the side walls and would possibly give a fair indication of the light reflecting value of those walls under similar conditions. I am merely bringing this point up because, as stated, a wrong assumption is possible. There is not a showroom in this country where they can, at as slight an expense, make a demonstration which will mean so much to the public. It is not necessary perhaps to have 6 booths. You may have 1 booth and use colored window shades on rollers, which may be pulled down over the three walls, showing the effects of the changes in color. Throughout this entire showroom the question has evidently not been, "What will these fixtures cost? How cheaply may this be fitted up?" but how good; and that is a very excellent answer to the one point constantly recurring when you bring up the question of gas illumination, "Oh, gas is cheap, the fixtures are cheap;" and don't you know, gentlemen, I think when you come right back home with it, that we, ourselves, are largely responsible for that assumption on the part of the consumer. If all you have to show are cheap fixtures, you cannot expect the consumer to go out of his way to buy something from a paper representation, from an advertisement or from a free-hand sketch, when someone else is prepared to show him a finished electric fixture. They can get a much better idea of what we have when we exhibit the completed connected fixture. This may seem irrelevant, bringing in points of this kind, but I have really been in towns where the gas man said there was not much sale for gas illumination, and he did not have a single lamp in his showroom, not a thing to show the people what they could get; they depended upon the department store and the dealer. On page 18, second line, a phrase was used, "Removing all chance of the intensely brilliant light sources coming into direct line of vision." Now, that is an electrical term and it belongs to the electric man. It does not belong to the gas business. The specific intensity or intrinsic brilliancy of a mantle has been variously given at from 25 to 50-candle power per square inch. The highest factors I have secured with low pressure gas do not exceed 80-candle power per

square inch. Now, if that intensity can be described as "intensely brilliant," how can you describe the specific intensity of 1,000-candle power per square inch, which is not unusual with the latest incandescent lamps. One of the members, in conversation the other day, brought up the question that our lamps did not compare satisfactorily with the electric when the consumer looked first at the incandescent mantle and then at the electric filament. We do not want them to be compared that way. We have in the incandescent gas lamp what they have not got in the electric, and which they cannot get without a very considerable reduction in efficiency; that is, a low specific intensity or intrinsic brilliancy. The electric man would give a great deal for this advantage, the value of which I do not think we fully appreciate. If we can say a source having a specific intensity of 25 to 80-candle power per square inch is "intensely brilliant," where are our superlatives coming from to describe the 1,000-candle power per square inch. I should like to criticize that fixture in the butler's pantry. It is a fixture such as is very commonly used in kitchens all over the country, a light ½-stem, 3 or 4 feet long, with an upright mantle. I do not know of any one fixture in the house which will do as much to depreciate gas illumination as that kind of fixture with that kind of lamp. There is constant breakage. You can hardly touch the lamp, turn a key or pull a by-pass chain without whipping the skirt off the mantle. In a short time the mantle or cylinder is gone and mantle lamps come in for severe criticism when the fault is due entirely to a cheap, flimsy fixture. With the inverted lamp 1 foot or 18 inches below the ceiling, using a by-pass with a long chain, you will never have that difficulty nor have any mantles broken to speak of. I have known mantles on lamps so installed to run 2 years without any attention. The illumination measurements here given should not be compared with those reported a year ago on these same floors without a careful consideration of how these measurements were taken and what they represented. They should be looked into carefully. The discrepancies do not show depreciation nearly so much as might be assumed. The latter part of the paper, covering the ventilation, temperature and CO_2 content of the room, is extremely interesting. A number of tests of this kind have been reported at different times, but we cannot have too many of them, and I might say here that the gas man is the hardest man to convince on that question of ventilation by utilizing the heat from the gas lamps. Dr. Samuel Rideal reported, in the "Journal of the Sanitary Institute," in a paper covering 83 pages, an investigation of temperature and CO_2 content conditions in a room, with a number of operators using both gas and electric lamps. They were unable to find any difference—that is, any appreciable difference—whether gas or electricity were used in that room, except that in a small room the ventilation was decidedly better with gas than with electricity. These points may seem of greater importance to me because they are most frequently brought up. I have had a great many gas men asking for answers to various points brought up from time to time, and the one particular point that is constantly returning is this question of ventilation of air and increased temperature. The distributed unit system, described on the third floor, is coming into quite general use. I believe it has even a wider field, especially in rooms having comparatively low ceilings. A member in speaking to me stated that he found this method very satisfactory in certain rooms in his own home to use a single inverted lamp on the ceiling within a foot or 18 inches of the ceiling. I have 3 or 4 rooms equipped in this way, and the general experience has been that the family prefer to read and sit in the rooms so illuminated. That is the best we can do in residence work with the fixtures and lamps now available. For residence work our lamps are generally too large. You will not find a fixture man who will care to put in a fixture having less than 3 lights. Consider the ordinary 3½-foot lamps now used. You would not be pleased to use 3 lamps of that size in a room in the ordinary residence. You may have 3 small flames, but when you consider that you have at least 5 times the quantity of light per cubic foot of gas with mantle burners, the open flame should not be considered as available. We need more small lamps, and then we can claim attention to residence work and can deliver the effects desired and keep within the minimum appropriation.

The President—Is there any further discussion on this paper?

Mr. Gifford—I should like to ask a question in regard to ventilation. Where are the air outlets with reference to the upper or lower parts, and are they so placed that when the fans are not running the heat from the burning gas will do some ventilating. Unfortunately some of our show rooms are not equipped with fans for ventilation.

Mr. Waring—Regarding the illustration (Fig. 12) I should like to ask if the products of combustion from the instantaneous water heater are allowed to escape directly into the room and depend upon the action of the fan to remove these products. It would seem to me that, in a modern bathroom, this instantaneous water heater should have a good flue connection. It may have such a connection, but if it has, it is not clearly shown in the cut.

The President—While I do not intend to discuss the paper, I can see no reason why a gas company should not take as much pains to display its goods to the public as do the drygoods merchants, the milliners or the clothiers. If there is no further discussion, Mr. Scofield will please answer the questions that have been asked.

Mr. Scofield—As to what Mr. Macbeth said, first, on the co-efficients. I think it is definitely stated in the paper that it was not the intention to assume those values were as co-efficients of reflection of those colors. I did not mean to steal any of the electric people's thunder in the matter of intensely brilliant light sources, and the point Mr. Macbeth brought out had not occurred to me before. I also plead guilty to the fact that the fixture in the butler's pantry, as suggested by Mr. Macbeth, could be improved upon; and in the illumination fixtures on the store floor it is undoubtedly true that the illumination in the front part of that floor is considerably higher than in the rear of the room; and if the calculation had been made on simply the rear room instead of taking it for the entire floor, it would have brought a higher figure than 70.13. In answer to Mr. Gifford, the air outlets are all practically at the ceiling, and in that way the heat from the burners and the ventilating fan both aid in the ventilation. In answer to Mr. Waring, the instantaneous water heater in the bathroom has a flue connection. Unfortunately the picture does not show it.

The President—Gentlemen, Mr. Scofield has given us a very instructive paper. I would suggest a vote of thanks.

A vote of thanks to Mr. Scofield for his paper was then duly ordered.

The President—The next paper is

LAYING A 48 INCH AND TWO 36-INCH GAS MAINS UNDER THE HARLEM RIVER.

by Mr. C. C. Simpson.

Forty-eight-inch Main—The 48-inch main was laid for the purpose of additional supply of gas for Bronx Borough.

The Borough of the Bronx is practically a city of itself, with a population of 430,000. The capacity of the Central Union Works, which supplies the entire Borough, is 11,000,000 cubic feet per day, with very little, if any, room for extension. The maximum send-out from these works during the winter of 1909–1910 was over 10,000,000 cubic feet.

From the normal increase of population in this territory (over 10 per cent. a year), it was evident that steps had to be taken to provide an additional supply of gas. This gas—pending the completion of the Astoria-Port Morris tunnel—must necessarily come from Manhattan. Two methods were considered for bringing gas from Manhattan to the Bronx.

First—To build a tunnel under the Harlem River from 129th Street, Manhattan to Lincoln Avenue, Bronx. Through this tunnel a 48-inch line would be run from the end of the present 48-inch main near 129th Street to Lincoln Avenue, and from that point to the Central Union Works. The cost of this tunnel, taking into consideration the purchase of sites for the two shafts, would have been not less than $500,000, and the difficulty of obtaining franchises and acquiring suitable property would have made the minimum time of construction two years.

The second scheme was to replace the present 20-inch main at this point with a 48-inch main, laying it at such depth below the bed of the river so as to insure against any possibility of damage from the buckets, anchors or the heavy, steel-shod spuds of dredges operating over the line of the main, and also to provide for any future deepening of the channel. (Fig. 1 shows the manner in which the former 20-inch main at this point was put out of service by a dredge spud.) The cost of this second scheme would be less than $150,000, and the work could easily be finished in from 6 to 9 months, thus allowing us to furnish gas in this way during the coming winter.

Taking into consideration, then, the items of time and cost, the second method of crossing the river was adopted. The general plan for carrying out this work (see Fig. 2) was as follows:

Steel caissons 10 feet in diameter were sunk just back of the bulkhead line on each side of the river. The bottoms of these caissons were then sealed with concrete, a drip pot was placed in each, and the standpipes built up inside. Cofferdams of steel sheet piling, in

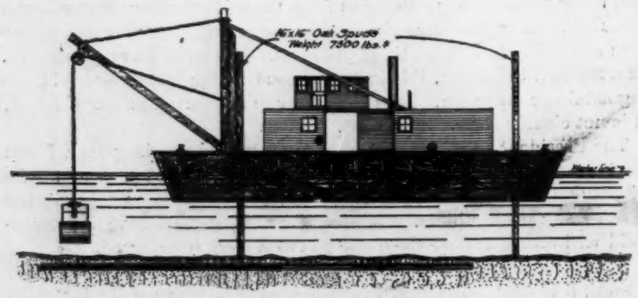


Fig. 1.—Diagram Showing way in which 24-Inch Submerged Gas Main was Broken by Dredge Spud.

Fig. 2.—Profile of 48-Inch Harlem River Line Looking West.

successive 125 sections, were then driven across the river, the pipe being laid on concrete piers as soon as the material was pumped out. The channel at this point extends from bulkhead line to bulkhead line (550 feet), and as there is a great deal of shipping, it would not be possible to close off more than half of the river at any one time.

The pipe used was ordinary water-weight (8,400 pounds per length) hub and spigot pipe, the depth of hub being 6 inches. An inside joint ¾ inch wide (see Fig. 3) was provided by not allowing the spigot

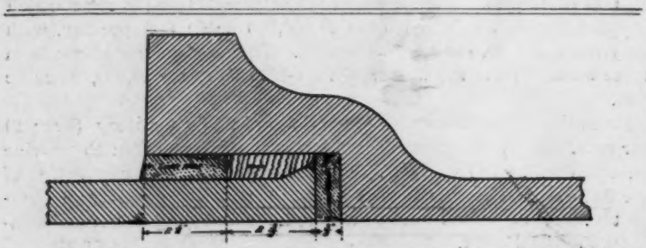


Fig. 3.—Section Hub and Spigot 48-Inch Harlem River Main, Showing Inside and Outside Joint.

to enter the full depth into the bell. As an additional precaution against breakage, and also to weight the pipe, a complete decking of concrete blocks was placed over the main (see Fig, 4).

The actual work started with the sinking of Caisson A on the Manhattan side of the river. Fig. 5 shows the general design of this caisson, which is composed of sheets of ¾-inch boiler plates. A guide frame of 12-inch by 12-inch timbers was erected, and through this the first four sections were lowered by means of the derrick scow, until the cutting edge had penetrated 5 or 6 feet into the mud. (See Fig. 6.) Four steel hooks, which had previously been placed under the cutting edge, were then fastened by means of wire cables to four 4-ton differential blocks, which were in turn secured to the guide frame. This scheme allowed us to hold the caisson at any time to allow the bolting on of additional sections, and also to check the progress should bad quicksand be encountered.

The material inside the caisson was then pumped out by means of an 8-inch centrifugal pump, and a head of water greater than that outside constantly maintained by pumping in with a 12-inch pump. It was necessary to use a diver to tend this 8-inch suction, and also to loosen up the material by means of a water jet.

Additional sections were bolted on as the cutting edge was lowered, and on the inside flange of each section a loading platform, holding 10 or 15 tons of pig iron, was placed to help overcome the skin friction. (Fig. 7 shows the 8-inch and 12-inch pipes and also one of the loading platforms. Fig 8 shows the pumping plant in operation.)

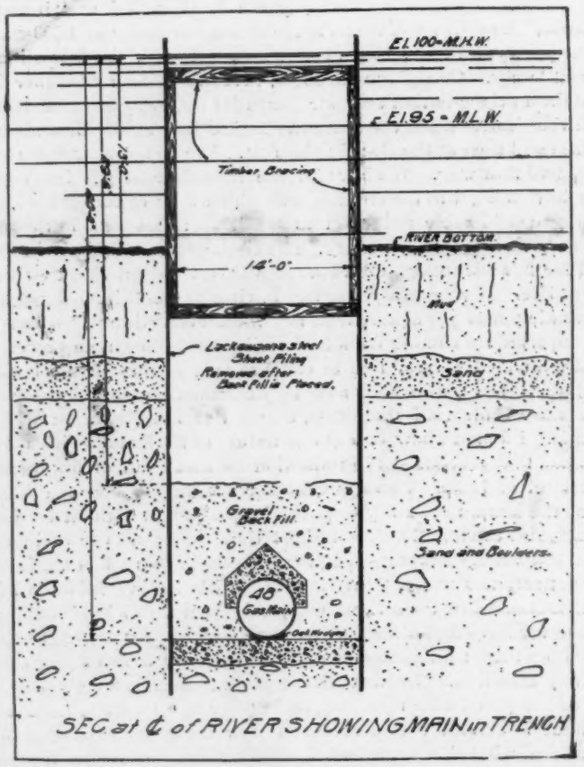


Fig. 4.

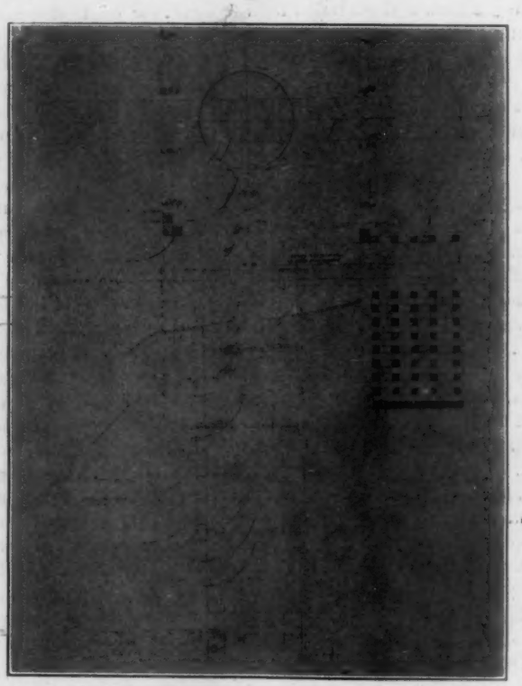


Fig. 5.

When the cutting edge was within 6 feet of the final grade, a slight crack was noticed in the street surface near an adjacent elevated railroad column, and levels showed a settlement of this column of about ¼ inch. This settlement was due to a layer of quicksand which we had penetrated, and to guard against any further movement we

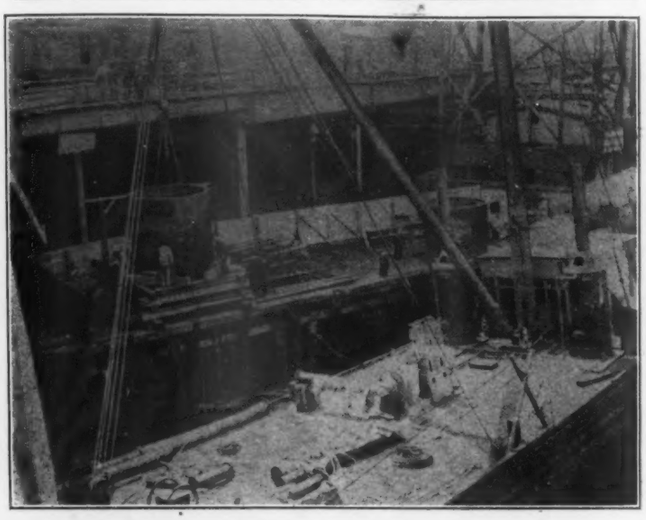


Fig. 6.

Fig. 7.

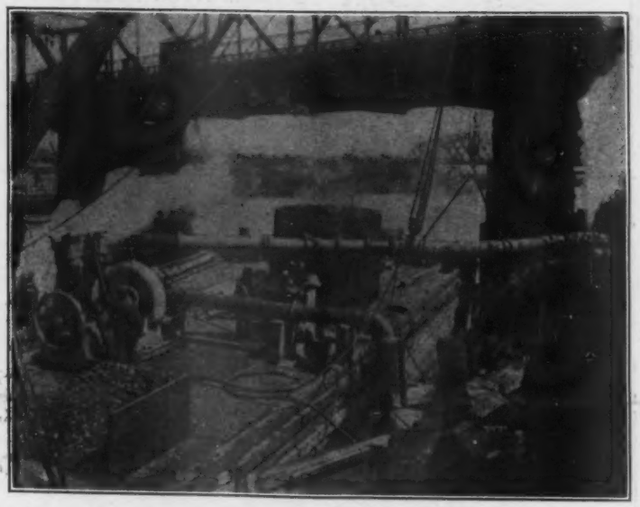


Fig. 8.

decided to drive a tight ring of steel sheet piling about 6 feet below the final grade of the caisson. Fig. 9 shows the relations of the column, sheet piling and caisson. After the driving of this piling no further settlement of the column took place, and the caisson was

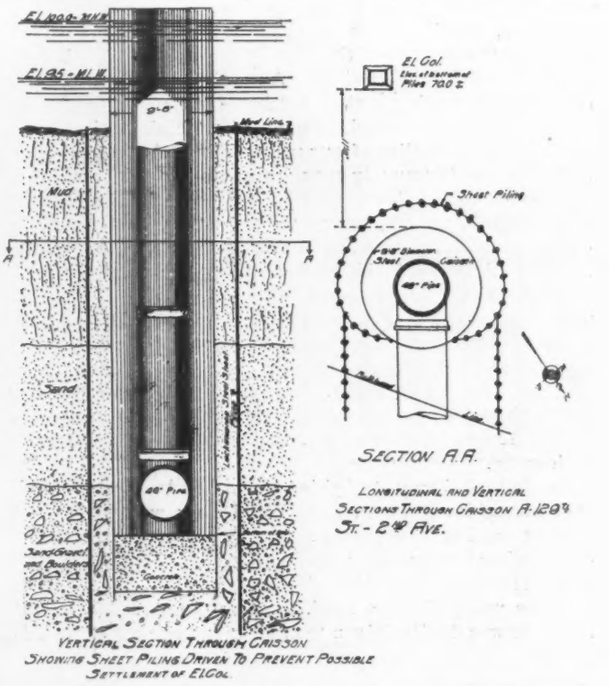

El. 100.0 - M.L.W.
El. 85 - M.L.W.
Mud Line
Mud
Sand
Concrete
Sheet Piling
SECTION A.A.
LONGITUDINAL AND VERTICAL SECTIONS THROUGH CAISSON A-120'9 ST. - 2ND AVE.
VERTICAL SECTION THROUGH CAISSON SHOWING SHEET PILING DRIVEN TO PREVENT POSSIBLE SETTLEMENT OF EL COL.

Fig. 9.

finally sunk to grade. The bottom was then sealed with a layer of concrete and the drip set in place. (Fig. 10 shows Caisson "A" sunk to grade and the first cofferdam being driven.)

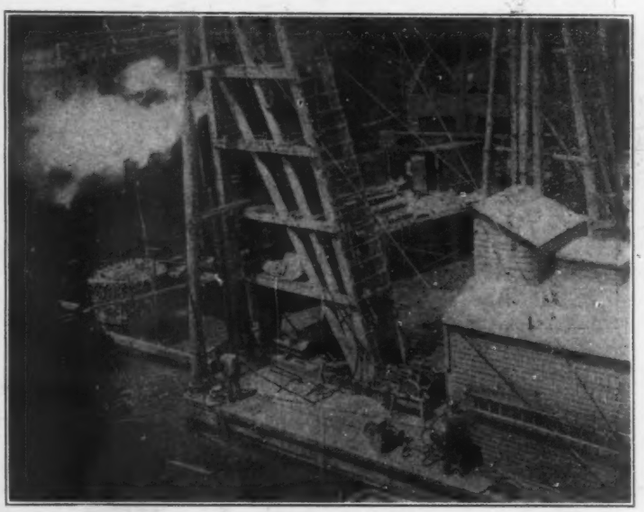


Fig. 10.

While this work was going on Caisson "B" on the Bronx side of the river was started. This proved a much simpler matter than Caisson "A," as there were no elevated railroad columns to contend with. The material through which this caisson was sunk was a very sticky mixture of clay and sand. It was impossible to pump this, so a ¾ cubic yard Hayward, orange-peel bucket was secured and the material excavated by means of this, with very little assistance from divers. When this caisson had reached grade the bottom was concreted and work at this point temporarily discontinued until the main had been laid clear across the river. As stated before, the large volume of shipping at this point prevented us from closing more than one side of the river at a time.

In laying the pipe in the river the original idea was to dredge an open trench of the required depth, allowing the banks to take their natural slope. It was finally decided, however, on account of the great depth of the trench and the uncertainty as to what angle of repose the material would take under the action of the strong tide, to drive sectional cofferdams of steel sheet piling. While this method

might have delayed the work a little it would certainly be much safer in the end, especially as we were unable to obtain any definite information as to the depth of the foundations under two adjacent piers of a heavy railroad drawbridge. An order was therefore placed for enough of this piling to sheet 150 feet of trench. Pending the arrival of this piling, we pumped the mud from 4 high-tension cables which lay directly on the line of our main. Divers fastened these together and there was fortunately enough slack to allow us to pull them about 15 feet east, so as to leave them entirely out of danger and clear of our trench. It was necessary to watch these cables very carefully during the entire process, as any break would have made us liable for heavy damages, besides endangering the lives of the workmen.

The river at this point is about 15 feet deep at high water. The permit granted for the main required it to be laid about 20 feet below the river bed. This would make the bottom of the trench at the center of the river (which was also the summit of the main), 42 feet below mean high water. This allows for a concrete pier about 2 feet thick under the pipe. At the shore ends, allowing a grade of 1 inch in 12 feet. The bottom of the trench was 45 feet below mean high water.

The first consignment of piling (in 45-foot lengths) arrived shortly after the cables had been moved, and work was started on the first 130-foot section of cofferdam. The piling was driven an average of 4 feet below the pumping grade by means of a Vulcan steam hammer. The work was rather slow at the start, due to a layer of large boulders underlying the sand, but the section 130 feet long and 14 feet wide was finally driven to grade and pumping started. (Fig. 11

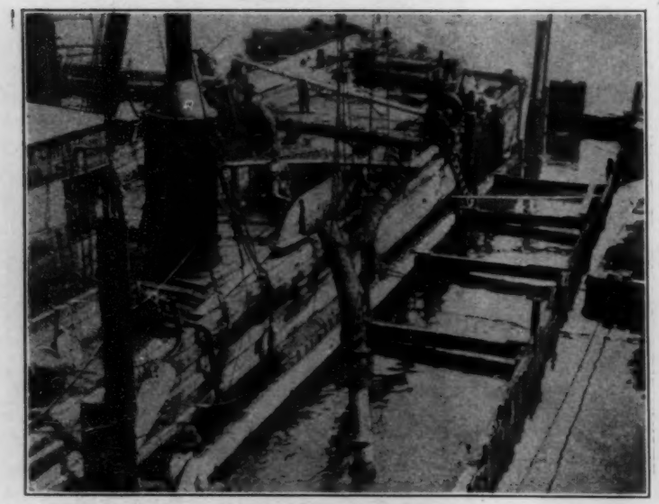


Fig. 11.

shows the sheet piling on this section driven and pumping in progress.) This pumping was done by the 8-inch and 12-inch centrifugal pumps worked from the derrick scow, with a diver tending each suction and stirring up the material with a 5 inch water jet. We were able to take out from 100 to 150 yards per day until the layer of boulders was reached. Pumping here became rather difficult and much of the material had to be removed by the divers. (Fig. 12 shows the largest boulder encountered.)

There was originally a rather strong tide at this point and it became considerably stronger after we had dammed off part of the river. This necessitated some heavy cross-bracing to keep the sheeting in shape when the trench had been excavated. Fig. 4 shows a cross-section of this trench with the pipe in place, and also the amount of bracing necessary.

When about 20 feet of the inshore end of this cofferdam had been pumped to grade the plate over the lower opening in the caisson was removed, the first concrete pier (6 feet long, 14 feet wide and 2 feet deep) placed and the first length of pipe lowered and calked into the drip. The drip was then centered into the caisson and the standpipe built up. In all cases, in making up the joints on this line, a pair of ¾-inch rods tapered at the ends, were placed across the hub, allowing for an inside joint ¾ inch wide and 2 inches deep. (See Fig. 3.) After the outside joint was calked these rods were withdrawn by means of turn buckles, and when a section of pipe was completed

Fig. 12.

and pumped out, men were sent inside to calk these joints. All the calking both above and below the water was done with lead wool and pneumatic tools, considerable time and expense being saved by the use of the latter.

As successive lengths of the trench were pumped out the concrete piers were placed and the pipe lowered and set to grade. The pipe was placed two lengths at a time, the two lengths being lined up and caulked on the derrick scow, then firmly strapped to a 15-inch I-beam and lowered into place. This made it necessary to have only every second joint calked under water by the divers. (Fig. 13 shows the method of placing the pipe into the trench.)

Fig. 13.

In laying pipe under water it is usually a rather difficult problem to preserve line and grade, but on this work it was simplicity itself. Divers first placed heavy wedges under the pipes on the piers. Then by means of a long rod held on top of the pipe and read from instrument on shore, the divers were signalled to wedge up until the pipe was at the proper grade and the line then checked from the instrument.

After the pipe had all been laid and calked in this section the end was closed by means of a plug and a rubber gasket, and the water pumped out. An inspection by the engineers in charge was then made and the main found to be absolutely tight and true to line. Advantage of this opportunity was taken to calk the inside joints and at the same time the concrete protection blocks were lowered into place. As an additional precaution against breakage the trench was back-filled to a depth of 4 feet above the concrete blocks with gravel. The sheeting was then pulled and driving started on the second section of cofferdam.

This second section was driven for a distance of 143 feet, carrying us to the center of the river. Both the driving and pumping on this section were much easier than on the first, the layer of boulders seeming to thin out toward the center of the river. The trench was driven, braced and excavated in precisely the same manner as in the first section, and after the pipe had been laid and calked the water was pumped out and a second inspection made. The line proved absolutely tight and correct as to line and grade, so that the protection blocks were ordered placed and the sheeting pulled.

We decided to make the third section of cofferdam continuous across the north half of the river, leaving the trench open at both ends and re-driving the sheeting at the north end of the trench, as the pipe was laid and back-filled at the south end.

Two 36-inch Lines.—The two 36-inch submerged lines were laid for the purpose of bringing gas to and from the upper Manhattan main system and a new 10,000,000 cubic foot holder (point *A*, Fig. 14).

While the general scheme for this crossing is somewhat similar to that for the 48-inch main above described, there are several points of difference which can best be seen by referring to Fig. 14, showing a plan and profile of the lines.

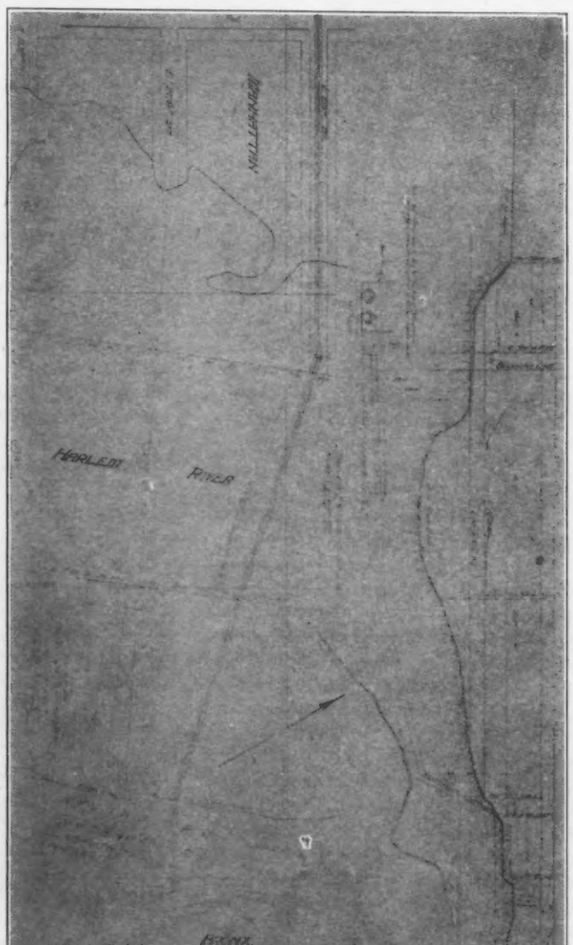


Fig. 14.

The river at this point is about 400 feet wide between established bulkhead lines, and for this distance we decided to keep the top of the pipe 20 feet below the river bed, the same danger from dredge spuds and future deepening of the channel existing here as at the point where the 48-inch crossing was made. From the west shore line to the west bulkhead line there is 190 feet of low marsh about 10 feet below the established street grade. We decided, therefore, to lay the mains on a low trestle over this ground and to sink the Manhattan caissons just back of the bulkhead line. From the east bulkhead line to the west line of our holder property, a distance of 620 feet, the land is owned by the New York Central and Hudson River Railroad. As they expect to drive piles and erect buildings on this ground it would have been impossible to lay our mains through it on a trestle, so it was decided to take a gradual slope from the east bulkhead line to the railroad tracks, and then pass under these by means of a concrete culvert.

(To be Continued.)

[Abstract Report.]—Continued from Vol. XCIII., p. 1233.]

SIXTH ANNUAL MEETING, NATIONAL COMMERCIAL GAS ASSOCIATION.

Held at Mechanics' Hall, Boston, Mass., Dec. 6th to 9th, 1910.

First Day—Afternoon Session.

The President announced that the reading of papers would be proceeded with. The first was that by Mr. William T. Barbour, President Detroit Stove Works, and was entitlled

MANUFACTURERS' PAPER.[1]

Mr. Barbour said that the subject-title of this paper offered such an extensive scope that it might be misleading, were it not now mentioned that the writer would endeavor to comply with the request of the Chairman of Committee on Papers to confine the remarks to "A comparison of the sales on gas and coal ranges covering a period of years, showing the great increase in the gas sales and the profits from the gas ranges, suggestions for increase in the use of high-class and better grade gas appliances, etc." Continuing, Mr. Barbour said:

Perhaps in no other commercial and manufacturing industries are the opportunities for harmonizing relationship and the general standardizing of products any greater than those of the producers of gas (the gas companies) and the producers of gas ranges (the stove manufacturers). Their paths to the gas consumer possess many lines in common, and of mutual benefit to all parties concerned.

It is only during the past 10 years that gas companies have been alive to the great possibilities in gas as a fuel for cooking and heating. Gas for cooking has long since passed the experimental and emerged from the promotion stage, until it is now a settled, practical factor; and, in producing that result, the stove manufacturer has been the assistant or handmaiden of the gas company. It has taken much thought and patience to educate the consumers of gas to the point of using it for fuel purposes; but, through the efficient assistance of the goods produced for that purpose by the stove manufacturers, improving as they have their products, as the use of gas became more and more an established condition, the problem has been solved and the use of gas as a fuel firmly established, now ranking as a keen competitor with coal and wood wherever it may be obtained throughout the world.

This desire of the gas companies, their faith in their product and the faith of the stove manufacturers in their gas ranges were not alone in bringing about these results. We must not forget the consumer—the friend of us all. We all know we cannot live without the consumer. It is he who kicks at the gas bills, meters and pressure; it is he who uses all manner of products. Without him there could be no incentive to labor or effort to improve the methods as used by the people of the past. The criticisms and suggestions as made by him have a tendency (much as we dislike to admit it) to improve our products and make us all less liable to criticism. The consumer stands for better and cheaper gas, and better and more economical appliances for the use of gas.

In the early days gas stoves were considered a summer luxury, to be used during the hot summer months when coal and wood fires heated the kitchen to a degree too great for comfort; therefore, the "temporary outfit" was used. Soon the hot plate, or cooker, was found to be more than a toy and that gas was a practical cooking fuel. * * * About the same time a few stove manufacturers began to appreciate this fact, and started the manufacture of a gas range; and, as the larger sales on this type of their product occurred during the late spring and early summer months, instead of in the fall months of the year, when they were busy with the coal stove trade, it would, therefore, be a great advantage to them to keep their foundries at work and be the means of increasing their total volume of business. Unfortunately, some of the stove manufacturers lost sight of many items of cost of producing gas ranges, simply figuring that the additional business would very materially overcome the overhead expense, apparently thinking that this expense would amount to nothing, as they had to keep their organization together, so that the gas stove did not bear its proper percentage of expense, such as selling, etc. In this way, the gas range very erroneously became a product of the stove manufacturer, made under a false impression as to cost thereof, and, like so many bad precedents established, has never been that source of profit to the manufacturer that it should be. It also was not a question of how good a range could be built,

1. In the absence of the author the paper was read by Mr. W. I. Hill, Sales Manager, of the Detroit Stove Works.

but how cheap. This theory has no doubt been partially responsible for a number of the so-called cheap types of gas stoves, and, while they may have answered their purpose in the introduction of gas stoves for cooking, I am glad to note that the average gas stove of to-day is very superior to that in use 10 years ago.

When the householder was called upon to use gas for fuel purposes, and when gas was selling at $1.50 to $2.50 per 1,000 cubic feet, it was immediately felt by the gas companies that something of a very radical and promising inducement would have to be made to prevail upon the former to change from coal or wood to gas as fuel for domestic purposes. With the various schemes to that end you are all more or less familiar; but the one great fact stands out that no encouragement was given the stove manufacturers in the beginning to produce their best. Quality was sacrificed in order that quantities of gas ranges might be sold and immediately produce quick returns by rapidly increasing the output of gas.

Nine years ago the majority of gas ranges were made with 14-inch ovens, which soon changed to the 16-inch, and now 18-inch ovens are the most popular, the sales on that size daily increasing. The recent demand for a gas stove of good quality and sufficient size for general cooking purposes, such as that of the cabinet type, has demonstrated that the people of the cities are now sufficiently educated to appreciate the convenience and utility of gas for cooking, and they do not hesitate, if given the opportunity, to purchase a higher grade of gas cooking appliance than has hitherto been offered them.

It has become an established fact that gas may be safely and economically used as a fuel and produce entirely satisfactory results, and, instead of looking around for something with which to experiment, the day has now arrived when the average consumer wants the best gas range that he can obtain.

That the foregoing advantages must have had an effect upon the sales of coal ranges in communities supplied with gas was evident, and, as the years succeeded one another, the manufacture and sale of gas ranges have gone forward with leaps and bounds. It is with great regret that I am unable to obtain absolute figures as to the increased sales of gas stoves within the last 10 years. This information is unobtainable, I believe, unless it can be produced from records kept by the gas companies of the country. The manufacture of gas ranges has increased to quite an extent; in fact, the combined records of manufacturers, who have been producing gas stoves for the past 10 years, show an increase of nearly 350 per cent. There are now in the United States 86 makers of gas ranges, as nearly as I am able to learn, as against 26 or 28 in the year 1900. The following figures have been obtained from a number of manufacturers, and while they do not tell the whole story, I believe will give a very good idea of the percentage of increase in the number of gas stoves, both ranges and heaters sold.

Year.	Coal Stoves. All Kinds.	Gas Ranges and Heaters.	Oil and Vapor.
1900	3,480,000	200,000	300,000
1901	3,385,000	225,000	350,000
1902	3,375,000	250,000	350,000
1903	3,820,000	250,000	350,000
1904	4,030,000	300,000	300,000
1905	4,280,000	350,000	300,000
1906	4,153,000	695,000	250,000
1907	3,821,000	600,000	250,000
1908	2,521,060	614,000	No record.
1909	2,871,080	779,000	No record.

It is also noticeable that an increase has practically been made each year, regardless of general business and financial conditions during the past decade. In gas supplied communities these increased sales of gas ranges must necessarily have had their effect upon the sale of coal and wood ranges; but to what extent gas stoves have replaced coal stoves can only be determined by the gas companies who have kept a record of coal cooking appliances they have supplanted with the gas range. Furthermore, such statistics as I have been able to obtain, in consequence of their embracing all kinds of coal and wood cooking and heating stoves, are susceptible of error on account of the gradually increased use of warm air furnaces and steam and hot water heating appliances, all of which have more or less had an effect upon the sales of coal and wood heating stoves. It is, therefore, readily observed that the total volume of stove sales for the year 1909, as compared with that of 10 years ago, is not the proper data to use by way of comparison, when considering the coal range sales and the effect that gas range sales has had upon them. * * * *

Gas ranges, as made to-day by the various stove manufacturers, possess very little difference in construction, apart from the outer designs, character of workmanship and quality of material used. The underlying, fundamental principles of operation are practically the same, so that the construction and method of operation of gas ranges may be said to have been standardized. Deviations in construction and adjustment of certain parts, however, are still made necessary owing to physical characteristics and variations in pressure of the gas as manufactured and delivered in various localities. Now, while gas ranges as at present constructed may be made, in the majority of cases, to take care of these variations in pressure, B.T.U.'s, specific gravity, etc., of gas, the fact still remains, when it becomes practical for the numerous gas manufacturers to adopt and maintain a uniform quality and pressure of gas, the gas stove manufacturers will be able to simplify their product, and gas will more closely resemble the stability of the fuels (coal and wood) that it aims to replace.

In concluding, the author said: Finally, as to increasing "the use of high class and better grade gas appliances," in the opinion of the writer that problem is gradually being settled in its favor. Let the gas companies be not afraid to recommend and push high grade, well constructed and economical gas ranges, and they may have no fear of the outcome. Do not look for cheapness, for if you do you will get just what you pay for. Always buy and recommend the best to the consumer. It will be the most satisfactory for all parties concerned.

It has been clearly demonstrated that the manufacturers are ready to produce the ranges and the consumers are ready to use gas as a fuel. It only remains for the gas companies to standardize quality and pressure of gas, to remove all obstacles and place the use of gas on a plane of superiority from every standpoint compared with other known fuels.

The exchange of ideas and closer association between gas manufacturers and the stove manufacturers and the good work of your Association are worthy of comment, and I believe have done much to increase the sale of the gas range to our mutual benefit; but the fact that the gas company continues to make a profit on the sale of gas, while the manufacturer makes but one profit on a stove, and that a small one, should not be forgotten.

Discussion.

The President said in presenting this paper for discussion, as in the case of all the papers which they should have, we wanted to suggest that the principal value of these meetings, as they all knew, rested in their discussion. He hoped they would have a free interchange of ideas on the various subjects, the more differences of opinion being brought out the better the discussion will be.

Mr. S. Tully Willson said that Mr. Barbour had covered the subject so thoroughly, and had made no statements save of facts, that it would be pretty hard to start an argument on the paper. He would like, though, to emphasize a few of the passages, even if such emphasis amounted only to repetition. Mr. Barbour mentioned the growth of the cabinet range from the hot plate, and there had been question and argument as to the advisability of selling them for domestic use; but it seemed to the speaker from Mr. Barbour's paper that the hot plate was the seed. Whether one had to sow seed or transplant cabinet ranges would depend largely upon the local soil. The automobile dealers reported that the great majority of their large cars were sold to replace smaller ones, and he believed a like condition existed with the gas range buyer. Economy of operation is an important item, but service was more important, and to get good service one had to buy good goods. Mr. Barbour had made that point strongly. If it were only a hot plate it should be the best; then you had made a friend for gas. A range having a baker is a vital point, for should the housewife get a range which did not bake well, gas would lose prestige and revenue. As Mr. Barbour said, the manufacturer's profits on appliances is small and comes but once, whereas the gas revenue continues. The manufacturer in selling to a gas company was dealing with a jobber who retailed the goods for him, which was a reason it was possible to produce the goods so cheaply. For years the quality had been hammered down through gas companies buying the lowest priced goods, failing to recognize the difference in quality. Some companies, though, discovered their mistake and rectified it, the marked improvement in ranges in the last few years being a result. The manufacturer preferred to make good goods, but he could not do this unless the goods were bought. They were all growing together, the gas man and manufacturer's interests being mutual, so the wonderful success depicted by Mr. Barbour added to their enthusiasm. They could not help growing.

Mr. Frueauff thought Mr. Barbour could properly change a delicate suggestion made on the last page of his paper to a direct criticism, when he referred to the seeming lack of uniformity found in

many gas plants, both as to quality and pressure, which carried necessarily an added burden on the manufacturer to compensate for as best he might in his appliances. It seemed to him the gas companies that had given time and thought to getting more uniform conditions have been well repaid for doing so, both in development of their lighting and industrial and fuel gas fields. Bearing that in mind and nothing could be done in that respect, the criticism of the manufacturers was a point that had to be taken home. It seemed to the speaker that the gas companies could properly call attention of the manufacturers to a field or two of which, while they were working them to some extent, it did not seem they realized the possibilities any more than possibly most of the gas company folks did. In many gas plants one will find special appliances being made to meet the need of particular consumers, in some special phase requiring a burner of peculiar type or unusual construction, at least something that was not found was being made by the average manufacturer of gas appliances. It seemed to him the gas business had reached the stage of development where the gas men could properly give more time to the development of new appliances to meet every possible need that the gas companies found in their business. The gas range development had reached a stage where, as to a great many of the companies, their large future in domestic gas was in the development of the water heater. He thought the manufacturers of gas appliances could very properly devote more time and specialize more on improvements in the water heaters than in attempting to improve in their gas ranges. In other words, the time had come when many of them could make that their leader. Rather than start with the gas range, they try to get the water heater when they could, a great many of them would work their hardest for the water heaters, letting the gas ranges come in with the balance of their business. He thought these suggestions, coming from a manufacturer, were good things for the gas men. If one would bear in mind Mr. Barbour's point, the desirability of uniform pressure and quality conditions, he thought they could profit by it. With a good many electric light companies no one thing they were more chary of than of their regulation. That was exactly the thing that the gas man ought to be most particular about in the supply of gas. The more uniform they got their pressure conditions the better service they got out of their appliances, the longer they would stay in use, and the more permanent became the use of gas.

Mr. P. S. Young said page 6 of the Barbour paper carried certain statistics, and it seemed to him there must be an error in the figures as to the 1908 sales of coal stoves. The drops were from 3,800,000 (in 1907) to 2,500,000 (in 1908), while in 1909 it was 2,800,000.

The President said Mr. Hill would note any questions, answering them at the end.

Mr. McLean asked about his figures for 1906 and 1907; also 1907 and 1908, respecting the total number of gas ranges and heaters put in service in that time. There seemed an enormous falling off between 1906 and 1907, then a slight increase, with an enormous increase between 1908 and 1909.

Mr. Hill said if one perused the paper very carefully he thought he would see Mr. Barbour claimed that this was not an absolutely accurate record, but a register, being as far as he could obtain the record of the number of stoves sold during the years specified.

Mr. Pettes thought, supplementing what Mr. Barbour said, another feature that should not be lost sight of in the argument in favor of handling a first-class range is that a poor gas range adds so much to one's distribution cost. Every complaint one got on a poor gas range meant sending a man on the job. It meant not only a loss in consumption and dissatisfaction on the part of the consumer, but an addition to one's operating cost. They should endeavor to get out a range, and water heaters too, that they knew were efficient. Another thing that would be greatly to the advantage of all gas companies would be to keep a record of all the repair parts they had to buy during the year. He thought that would aid them greatly in buying for the following year, because they all knew that repair parts were filling up their storerooms, and it meant added capital, on which they had to pay interest.

Mr. Roper said he had not read the paper. He heard it, however, and thought Mr. Barbour was to be congratulated on being honest to a greater extent than anybody else the speaker had known to present in any paper read before any Association with which he was acquainted. The author, however, forgot that one cannot charge gas companies with being the only ones that force manufacturers to produce cheap gas ranges. Interpreting Mr. Barbour's remarks it would seem he forgot overhead charges and cost. The men who were in the gas business when the stove manufacturers came into it had to compete with the stove manufacturer who did not figure his costs, with the consequence that they had to make cheap stoves. Prior to that time gas stoves were being sold for $22.50. The gasoline people coming along cheapened it a little more, because they insisted on using the bent iron legs, etc. Well, they had gotten by that, and the manufacturer was at a point where he figured his cost, and they were making money. He wished to take exception to one thing, and when he did he wanted it understood he was boosting the paper instead of finding fault with it. He thought Mr. Barbour was out-of-line where he said that we could live without the consumer—talking about the kicker, etc.—and that the criticisms and suggestions made by him had a tendency (much as we dislike to admit it) to improve the gas range. Mr. Roper differed with him, because the men who had absolutely made the stoves were not the men who bought them; but they had been the men on the floor. The man with the range in his hand would say: "George, I won't tell the boss; but here is something that needs correcting," and they corrected it. There is where they got the most information, but they had a hard time influencing the boss about it. There was no question but that the stoves of to day were far superior to stoves of a few years ago. While the manufacturer had gotten to figuring his costs, there had been no increases in the cost of ranges to the gas company up to the present time, for the simple reason that the increased production, together with the improved methods of manufacturing, had been sufficient to maintain a price and still make a profit. He believed the day was here when, if one was going to increase the quality, from now on the man that bought the range would have to consult the fellow that carried a wrench and pay for it or he would go backwards. Mr. Frueauff complimented him, although he put it in a different way from what Mr. Frueauff did, on the fact that the gas manufacturers did not make the stove men stand for all the mistakes and all the poor quality of gas, or when the gas was not good to say it was the stove. Of course, any trouble was going to be overcome, and while he never expected to see gas men make a uniform gas supplied at a uniform pressure, he did believe the day was near when the pressure in the mains would be so great—there would be a governor in the house—that if one wanted gas one could get it. They had more complaints to-day because one could not get gas than because the gas bills were large. The gas man who attempted to tell his consumers that he was trying to reduce their bills was lying to himself—the worst lie a man can tell—he is absolutely deceiving himself, because he is positively trying to increase his bill to enable him to have better service, letting him have the automobile service and pay for it. The point of it was the consumers had been educated up to the point that they want gas, and find fault with you now because you won't give it to them. Such was the absolute truth of the matter. The thing that had not been said, probably because it required a good bit of nerve to say it, was the greatest trouble and hindrance to day in improving the gas range were the large buyers who think they know and who say and demand, "You make me so-and-so and I will buy it." They should let competition spur the different manufacturers to produce a little better than their competitors, not give them a hide bound instruction, "You do so-and-so."

The President asked if Mr. Hill had anything to say in connection with the Barbour paper, and Mr, Hill replied in the negative.

(To be Continued.)

The Complaint Department of a Gas Works.

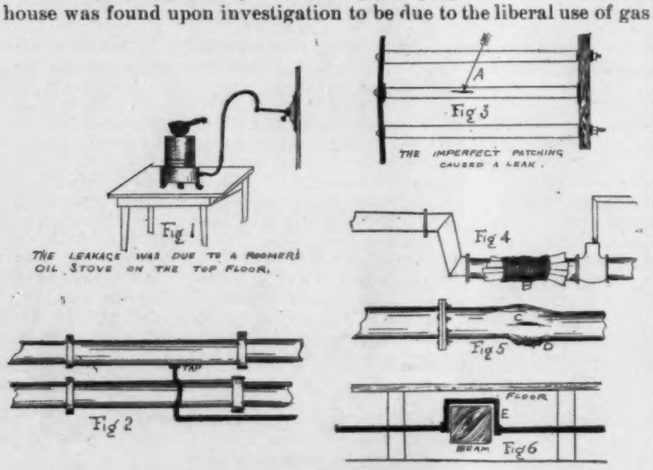
[Prepared for the JOURNAL, by "INSPECTOR."]

The complaint department of the ordinary gas works is an institution by itself. Men of special ability are needed in it. Those who can turn the scowls and lowering looks of patrons into the smiles and bring out gleeful ways are wanted in the wicker window where and when the complaints are being filed against the gas company. There are, and it is well known to the profession, graded series of complainers. In fact, anyone who has had a term in the department of information and complaints knows precisely how to grade the fault-finders. Some gas companies maintain an office of information, or an intelligence office, in which well trained office men may be devoting all of their time to giving out information in response to inquiries and who make it their business to pacify disgruntled users of gas. Men who have occupied positions of this nature for a year or more are to a certainty quite capable of placing the complainers in the graded list at a glance. Take, for example, the regular complainers or ingrained chronic kickers who come to the complaint office every time they have a bill to pay, with all sorts of fault finding, hoping possibly to get a discount on their bills or perhaps trusting that some favor will be forthcoming if a properly strenuous kick is made. Indeed, the regular kicker is well known in the office and the men in charge are on the watch for him. Then there are persons who, miserly inclined, kick on the amount of their bill and work for hours trying to get it reduced, claiming overcharging, etc. Then, of course, we have the class of really poor persons whose complaints are based on the desire that a reduction may be had following the objections to the gas. These objections, however, are usually the stock ones that the light was poor or the meter was out of order.

Still another class of complainers comes to the office entirely with the view of deriving better service. No complaint is made as to the charges for the gas or the amount consumed; but more and better illumination is required. Such persons are usually accommodated very readily by turning them over to the inspector in charge of lighting, who will investigate their lighting facilities and suggest where improvements can be made, adding other lights or promoting better arrangements. Then we have complainers who exist as a result of the competition of local companies furnishing other means of lighting. The gas man of 20 years ago knows all about this kicker, who would tell you how he or she will go to the competing lighting concern and take its lighting service instead of yours. There is the usual run of kicks about leaks of gas, poor service, mistakes of the men taking check on the meters, etc.

The gas company seeks to get men in the complaint department who are adapt at appeasing fault finders. In the early days one company employed a man to smooth over troubles with complainers, who made it his business to be as sweet as possible to the kickers. He would call at their houses, dressed in the very best suit possible to obtain. Topped off with a silk hat and decked with a buttoniere, he would in suave way convince the lady of the house, or perhaps the servant, that the gas company was not only trying to do its best to please the public, but would also lay stress on the fact that occasionally the basis of the complaints was more imaginary then real. His pleasing manner and complimentary words usually had the desired effect of restoring the *entente cordiale*.

Many of the filed complaints are, to say the least, odd. In one instance the leakage complained of by the proprietor of a boarding house was found upon investigation to be due to the liberal use of gas



for cooking by a roomer on the top floor, as illustrated in Fig. 1. The owner of a rug factory complained about the high charge of his bill for the quarter, and upon investigation it was found that a party operating a popcorn works near by had tapped the main, as in Fig. 2. These popcorn venders were foreigners, and a dozen of them lived in the apartment house basements, where they used gas for popping their corn. As it was impossible to find out who was the guilty one, for the foreigners were constantly coming and going, the gas company simply cut out the tap and let it go at that.

In another case, where a hotel man complained about leakage of gas, it was discovered that one of the gas heaters in one of the rooms was out of order. Some of the tubes leaked. One tube was closed at each end with a piece of wood, as in Fig. 3. The wood was closed in one of the ends of the tube by using bolts extending through two adjoining tubes. The leak was at *A*. The closing of the tube did not completely choke the leak and the gas escaped.

Another complainer of leakage of gas caused trouble for quite a while, because the escape source could not be located. Finally it was found in the wash room of the house where some one had undertaken to check a leak in a pipe by binding the crack with strips of rubber and tape, as at *B*, Fig. 4. This, of course, had to be removed and a new joint inserted to check the leak. Another party tried to thaw out some water pipes, and, as the gas pipe ran alongside of the water pipe, the process of alternating heat and cold caused the gas pipe to expand and crack, as at *C* and *D*, Fig. 5. The gas went through the house and an explosion in one of the closed basement apartments was narrowly averted.

Fig. 6 shows how the defective adjustment of a gas pipe almost created a fire in a house. The beam was in the way. Instead of running the pipe beneath the beam it was passed over the beam, as at *E*. In time the floor settled, crushing the pipe, and leakage occurred at the point between the beam and the floor. The leaking gases ignited in time and the house was almost set on fire before the flames were discovered and checked.

Items of Interest
FROM VARIOUS LOCALITIES.

With exceeding satisfaction we report that the last week in December 19 indictments against Mr. George M. Smart, for many years Secretary of the Dayton (O.) Gas Company, were nullified by the order of Judge M. S. Matthews. The correspondent who informs us respecting this happy ending of the case, incloses the following account of the affair and the subsequent proceedings: "The indictments charged embezzlement, and the total of the various sums concerned was approximately $250,000. The action of the Court completely exonerates Mr. Smart from charges and insinuations that amazed the people of Dayton when these charges were first publicly made. Early in 1907 an informal proposition had been submitted to the proprietors of the Company, then known as the Dayton Gas Light and Coke Company, to consider merging with the Dayton Lighting Company and other minor corporations engaged in lighting and power supply. Coincidently, the Directors of the Gas Company, inasmuch as no inventory had been taken, or a balance of the books struck in 45 years, decided to bring expert accountants from Cincinnati to investigate the affairs of the Company. The action was largely decided upon the solicitation of Mr. B. B. Dickey, Jr., and other younger Directors, Mr. Dickey's venerable father being the Psesident of the Company. The result of the investigation by the experts showed alleged discrepancies aggregating about $250,000. Then the weight of doubt was directed towards Mr. George M. Smart, Secretary of the Company. Shortly after the conclusion of the inquiry Mr. Smart was indicted on 19 counts by the Grand Jury, Mr. R. R. Nevins acting as county prosecutor. The Company did not prosecute the charges, and so far as the public was concerned it was felt that Mr. Smart had used the money to the advantage of the Company and with the knowledge of the other officials. Whatever the situation, however, the case was not pushed and the termination was witnessed the last Saturday in December, through these formal entries filed with the Court records. All the testimony was transcribed and it was declared by Judge Martin and Prosecutor Lenz that it was insufficient to convict. The Court's action is looked upon here as a complete vindication and exoneration of the charges made against Mr. Smart, exculpating him from any dishonesty in connection with the financial affairs of the Company with which he was for many years connected. Mr. Smart is now President of a large steel company in Red Key, Ind., and is also prominently identified with other industrial interests. He also maintains his active interest in Masonic circles."

THE Mineola (Long Island) *Gazette*, of recent date, notes that there are two bidders for the franchise under which to supply gas in the settlement of Mineola, the logical one, of course, being the Nassau and Suffolk Lighting Company, which is now operating a going business in the adjoining district of Hempstead. The other applicants are Messrs. Rossler and Southern, whose interests are local. While the matter is still in the very early stages of consideration, there is little doubt that positive action will be taken early in the spring, with the Nassau and Suffolk folks the ones likely to succeed in the premises.

MR. RICHARD STARKEY has been appointed chief electrician in the Orange section of the electric division of the Athol (Mass.) Gas and Electric Company.

THE new rate of $1.25 per 1,000 cubic feet, which concession was promised some time ago by the proprietors of the Bristol and Plainville (Conn.) Tramway Company, became effective the 1st inst.

A VERY agreeable surprise was experienced by the employees of the Savannah (Ga.) Gas Company when, the last week in December, they were notified that, beginning the 1st inst., an advance in wages and salaries, averaging 10 per cent., would become effective.

ARTICLES incorporating the Western States Gas and Electric Company, which were filed with the Secretary of State of California last month, show that the headquarters of the corporation are in Oakland, Cal., that the capitalization is $15,000,000, and that its Direc-

tors are: C. F. Maddock, Stockton; A. L. Chickering, Oakland; F. W. Stearns, Chicago; A. H. Sweet, San Diego; Evan Williams, San Francisco.

"B. F. F.," writing from Philadelphia, Pa., under recent date, says that an odd occasion came about in Columbia, Pa., last month, when Mr. C. Edgar Titzel, Manager of the Columbia (Pa.) Gas Company, gave a banquet to the plumbers of that thriving settlement Covers were laid in the dining room of the Hotel Columbia, and a score or more shared in the festivities. Manager Titzel was a jolly good toastmaster, and he was ably aided in the control of the feast by Mr. Henry von Neida, the Company's new business man, and Mr. Albert R. Apgar, Superintendent of works. Our correspondent in closing, adds: "The banquet was given in order to draw the plumbers together for an informal talk regarding how the Company could improve the gas system in Columbia, and it is a fact that the plumbers put forth several new wrinkles in such respect. The Company is getting ready to expend $20,000, which has been set apart for rebuilding and generally improving its plant."

THE unspeakable Turk at last seems to have found his voice in respect to improving some of the business centers of that purlieu of laziness. Imagine if, one may so stretch his thought, and still believe himself in right mind, of a city within a stone's throw of the Mediterranean sea, containing well over 200,000 inhabitants, that possesses not a single municipal work. No lighting system, no water supply, no sewers, no tramways. Such, however, is the condition of Alleppo, and Bagdad is little better off. However, now that the young men of Turkey are in the governmental saddle, projects for reforms in all municipal ways are many. As an example, the City Council of Bagdad has passed an order for the negotiation of a loan amounting to $300,000, the proceeds of which are to go to the widening of certain streets, so that the traffic of the town may be partly accommodated. Another case is that of the rapidly growing settlement of Messina, resting directly on the Mediterranean sea, the authorities of which have granted to a French syndicate the right to pave its streets, to build and operate a system of sewers, to carry on a water supply, to build a modern market, and to construct and operate gas and electric systems. In return the municipality agrees to pay the syndicate 5 per cent. on all the money it expends in carrying out the named purposes, and 2 per cent. additional as a sinking fund during a period of 30 years, at the end of which time the entire rights and property shall be vested in the city. Meanwhile, all profits arising from rents, water rates, etc., are to be divided equally between the city and the syndicate. Many other places are getting ready plans of moment for the betterment of their inhabitants, wherefore it might not be out of place for American gas works' constructors to look over the situation, with a view to helping the Turk without harassing themselves.

THE Cedar Rapids (Ia.) *Republican*, of December 22d, had this to say: "Yesterday the City Council received a letter from Mr. Thos. D. Miller, President of the Peoples Gas and Fuel Company, protesting against the price it cost him to secure a franchise for his Company. He cites that he first put up $1,500, and that afterwards he was asked to put up $1,000 more; that made a total of $2,500, and he states that he fully expected there would be some rebate coming to him. The expenses amounted to $2,500, except 47 cents that the city has on hand."

THE Union Gas and Electric Company sent a communication to Service Director Sandmaker, of Cincinnati, O., in which it was averred that, under the old contract, it had been furnishing gas for public lighting purposes at an actual loss, but had been loth to urge the fact heretofore, because it had been doing the public electric lighting at a small margin of profit. However, the loss had gotten to the point where it became necessary to ask for a new contract on lighting account that will call for increased payment per lamp, or a rate sufficiently high to permit it to perform the service at a slight profit. Mr. N. G. Kenan, President of the Company, declared that the gas lights are being lighted, extinguished, cleaned and repaired for $5 per annum each, under a contract that was made with the city by the Cincinnati Gas Light and Coke Company in 1866, and that his Company had continued the service in spite of loss up to this time, because it wished to do all in its power for the welfare of the community. The letter came to Director Sandmaker in reply to one forwarded by him to the Company asking for an accounting of some items that had been asked for in a resolution passed by the Council, in which it was demanded that the Directors investigate the rates charged by the Company for furnishing gas lights. The result of the investigation thus far is to precipitate the possibility that the rate will be raised. In any event, the letter was referred to the Board of Control.

MR. J. A. CARPENTER, of the law firm of Rogers & Carpenter, of Brooklyn, N. Y., representing Howard R. Gray, has applied to the Town Board of Orangetown, N. Y., for a franchise to manufacture and distribute gas for lighting, cooking, heating and power purposes in the district.

THE Pennsylvania Railroad management has decided to permit no cars lighted by explosive gas systems to be sent hereafter through its tunnels under the Hudson and East rivers.

THE Arlington (Mass.) Gas Light Company is maintaining "A Model Gas Kitchen" in the premises, No. 527 Main street, Winchester, in which district it also supplies gas. Complete lines of cookers and the like are kept in stock, and during ordinary business hours a competent attendant is in charge ready to explain to any visitor the advantages of gas in the kitchen.

A SPECIAL meeting of the shareholders in the Worcester (Mass.) Gas Light Company will be held in its offices at 11 A.M. of the 12th inst. The session will be held for the purpose of determining whether or not the Company shall apply to the Board of Gas and Electric Light Commissioners for leave to increase its capital stock. The additional monies are to go towards paying for plant betterments.

BEGINNING the 1st inst., $1,000,000 in convertible bonds of the New Haven (Conn.) Gas Light Company are to be converted into and exchanged for an equal amount of its common stock. This revision will bring the capital of this Company up to $4,500,000. It has the right to issue stock up to the sum of $5,000,000.

MR. W. C. RUNYAN, Secretary of the Williamsport (Pa.) Gas Company, under the laws applying thereto, has advertised for the names and addresses of all holders of bonds of that Company dated February, 1899, and further requests such holders to at once report the amount of bonds held by them, with the direct statement as to whether such bonds are held individually or as trustee, agent or otherwise.

MR. E. N. DICKSON, at one time prominent on the office staff of the Milwaukee Gas Light Company, and later on President of the Dickson Malleable Iron Company, died at his home in Milwaukee the night of the 20th ult. He was in his 44th year, having been born in Milwaukee, February 21, 1866.

THE 1,500,000 cubic foot holder constructed by the Cruse-Kemper Company for the United Gas Improvement Company, at Harrisburgh, Pa., was turned over to that Company early last month and as per contract, is built, metal to metal, gas and water tight.

ABOVE is noted the fact as to two applications for a franchise to supply gas in Mineola, L. I., and since that was written a hearing over the appeals was made. The Nassau and Suffolk Lighting Company, through President McDonald, agreed to furnish gas on the basis of a royalty payment of 5 per cent. on the gross receipts. Mr. Rossiter, representing the other petitioner, submitted as his main inducement a selling schedule, based on monthly consumption, the maximum figure being $1.35 per 1,000, the minimum, $1 per 1,000. The matter was taken under advisement, and meantime another public meeting was called for, at which was requested the attendance of taxpayers and business men.

"B. L. M.," writing from Baltimore under recent date, says: "Some days ago the Citizens' Association, of Riverdale, Md., passed a resolution asking that the price of gas, which is supplied in Riverdale by the Hyattsville Gas and Electric Company, be reduced from $1.50 per 1,000 cubic feet to $1.25 per 1,000. A man named B. C. Wheeler is the instigator of the movement, and, if we mistake not, he is one of the real estate speculators who originally induced the Hyattsville gas men to lay pipes in Riverdale. The residents of the latter at that time were perfectly satisfied with the thought of $1.50 gas; but, now that the mains are in there the proposition assumes an entirely different aspect.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
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England—Aug. Siegle, 30 Lime street, London.

MONDAY, JANUARY 9, 1911.

The Market for Gas Securities.

The rumor mongers are very busy just now with the likelihood and the reverse of certain things in connection with the local gas situation. Now, according to the Dow-Jones' sheet consolidation between the Consolidated and Brooklyn Union. This is reported to be imminent. Well, if so, it has been equally imminent for 10 years. Our suggestion that the re-financing of the Consolidated is at hand we imagine is not far away.

The shares were bid 140¼ at noon to-day (Friday), and the volume of sales portends important happenings. Yesterday about 30,000 shares were sold.

The general market is strong, and one noteworthy thing is that values in Lacledes, of St. Louis, were quoted higher than those in Peoples, of Chicago.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

JANUARY 9.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$73,177,000	100	140¾	141
Central Union Gas Co.—				
1st 5's, due 1927, J. & J.	2,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	139½	139¾
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	⅝	¾
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,860,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	106½	—
Mortgages, 6's	3,600,000		89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108⅜
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	107¾	108½
Preferred	2,500,000	100	94¾	102
Bonds	10,000,000	1,000	102¾	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,370,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	106¾
Massachusetts Gas Companies, of Boston	25,000,000	100	89½	89⅝
Preferred	25,000,000	100	95½	96
Montreal Gas Co., Canada	3,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106	107
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	367	370
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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OFFICE OF THE UNITED GAS IMPROVEMENT CO., N. W. CORNER BROAD AND ARCH STS., PHILADELPHIA, December 14, 1910.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable Jan. 14th, 1911, to stockholders of record at the close of business, Dec. 31, 1910. Checks will be mailed.

1854-4 LEWIS LILLIE, Treasurer.

DIVIDEND NOTICE.

AMERICAN LIGHT AND TRACTION CO., 40 WALL ST., NEW YORK CITY, Jan. 3, 1911.

The Board of Directors this day declared from the net earnings of the Company the regular quarterly dividend of one and one-half per cent. (1½ per cent.) on the preferred stock of this Company, payable Feb. 1, 1911, to stockholders of record of preferred stock at the close of business Jan 14th, 1911. The Board also declared, from the undivided profits of the Company, a q arterly dividend of two and one-half per cent. (2½ per cent.) on the common stock of the Company, payable Feb. 1, 1911, to stockholders of record of Common Stock at the close of business Jan. 14th, 1911. The Board also declared, from the undivided profits of the Company, a dividend of two and one-half (2½) shares of common stock on every one hundred (100) shares of common stock outstanding, payable Feb. 1, 1911, to stockholders of record of common stock at the close of business Jan. 14th, 1911. The transfer books for both preferred and common stock will close Jan. 14, 1911, at 12 o'clock noon, and will reopen Feb. 1, 1911, at 10 o'clock A.M.

185 -1 C. N. JELLIFFE, Secretary.

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1857-1

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1843-tf Care this Journal.

WANTED,

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1846-tf Care this Journal.

POSITION WANTED.

A gas manager, now employed, desires similar position in city of 15,000 population or over. Excellent record for results obtained in all departments and will refer to past and present employers. Address, "D. S. C.,"

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Position Wanted.

Gas man, with technical training and 7 years' experience in one of the largest gas laboratories in the country, desires a position as superintendent or manager of a gas plant where a live man is needed.

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Address, "COMMERCIAL,"

1857-2 Care this Journal.

Position Wanted.

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Address, "C. P.,"

1857-2 Care this Journal.

WANTED,

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1857-2 Address, "BOX 102," care this Journal

WANTED,

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1852-tf Care this Journal.

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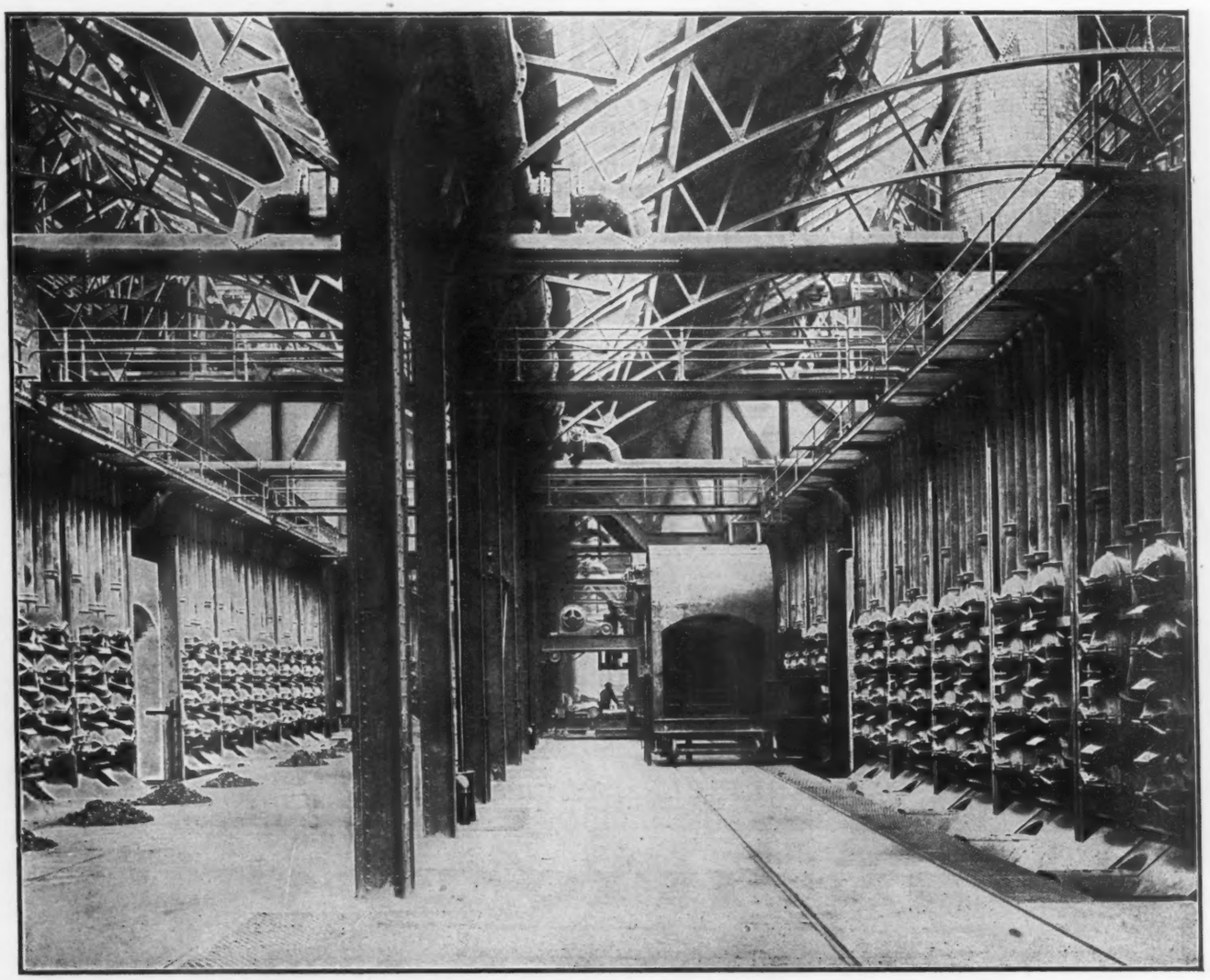

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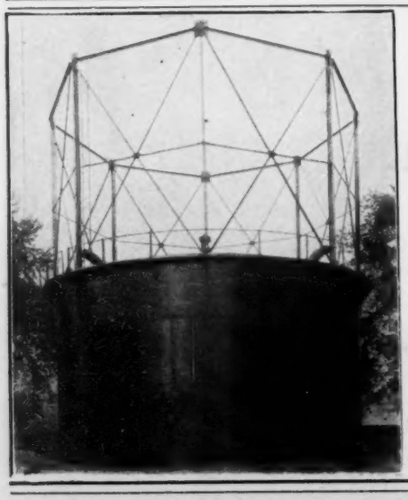

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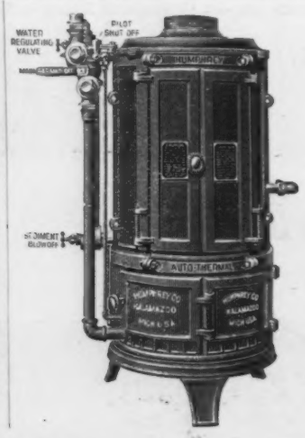

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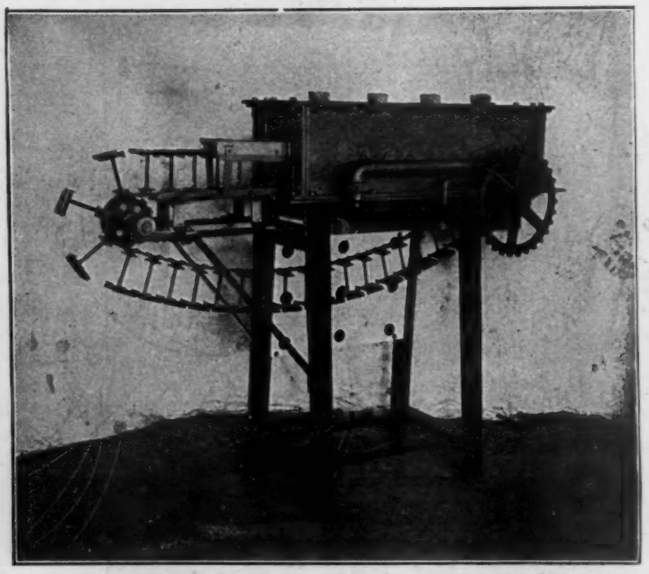

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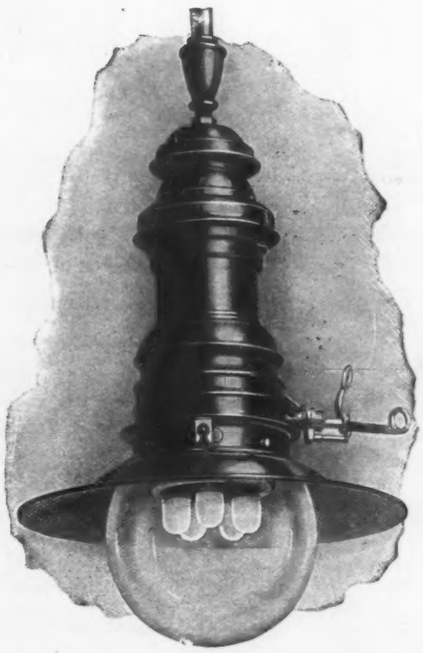

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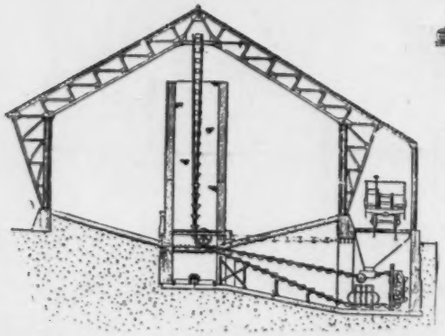

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MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October, 1911. ————————. Officers: President, Donald McDonald, Louisville, Ky. Secretary, A. B. Beadle, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1911. ————————. Officers President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street, New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, A. S. Harrington, Chicago, Ill.; Secretary-Treasurer, C. B. Strohn, Elgin, Ill.

Illuminating Engineering Society.—Annual meeting, Oct. —, 1911. Meetings of Sections, monthly. President, E. P. Hyde, Cleveland, O.; Secretary, Preston S Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 36 West 39th street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets Chicago, Secretary, F. H. Bernhard, Marquette Building.

Indiana Gas Association.—Annual meeting, Jan. 18 and 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mulholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June, 1911, ————————. Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, Sept. 1911; Detroit, Mich. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 13, 14 and 15, 1911; St. Louis, Mo. Officers: President, R. J. Irvine; Secretary and Treasurer, W. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December 5-12, 1911 Denver, Officers: President, C. N. Stannard, Denver; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 16, 17 and 18, 1911: Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O. Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1911; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Public Utilities Association.—Annual meeting, May 9, 10 and 11, 1911. Officers: President, E. C. Reynolds; Secretary, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1911, Oakland, Cal. Officers: President, F. A. Leach, Jr., Oakland, Cal.; Vice-President, W. Baurhyte, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1911, Reading, Pa. Officers President, J. H. Keppelman, Reading, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, Waterbury, Conn.

Southern Gas Association.—Annual meeting, April 19-21, 1911, Montgomery, Ala. Officers: President, H. W. Frund, Salisbury, N. C.; Secretary-Treasurer, Jas. Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, May, 1911, ———— Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, H. B. Head, Stephensville, Tex.

Wisconsin Gas Association.—Annual meeting, May ————, 1911, Milwaukee, Wis. Officers: President, W. H. Winslow, Superior, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.

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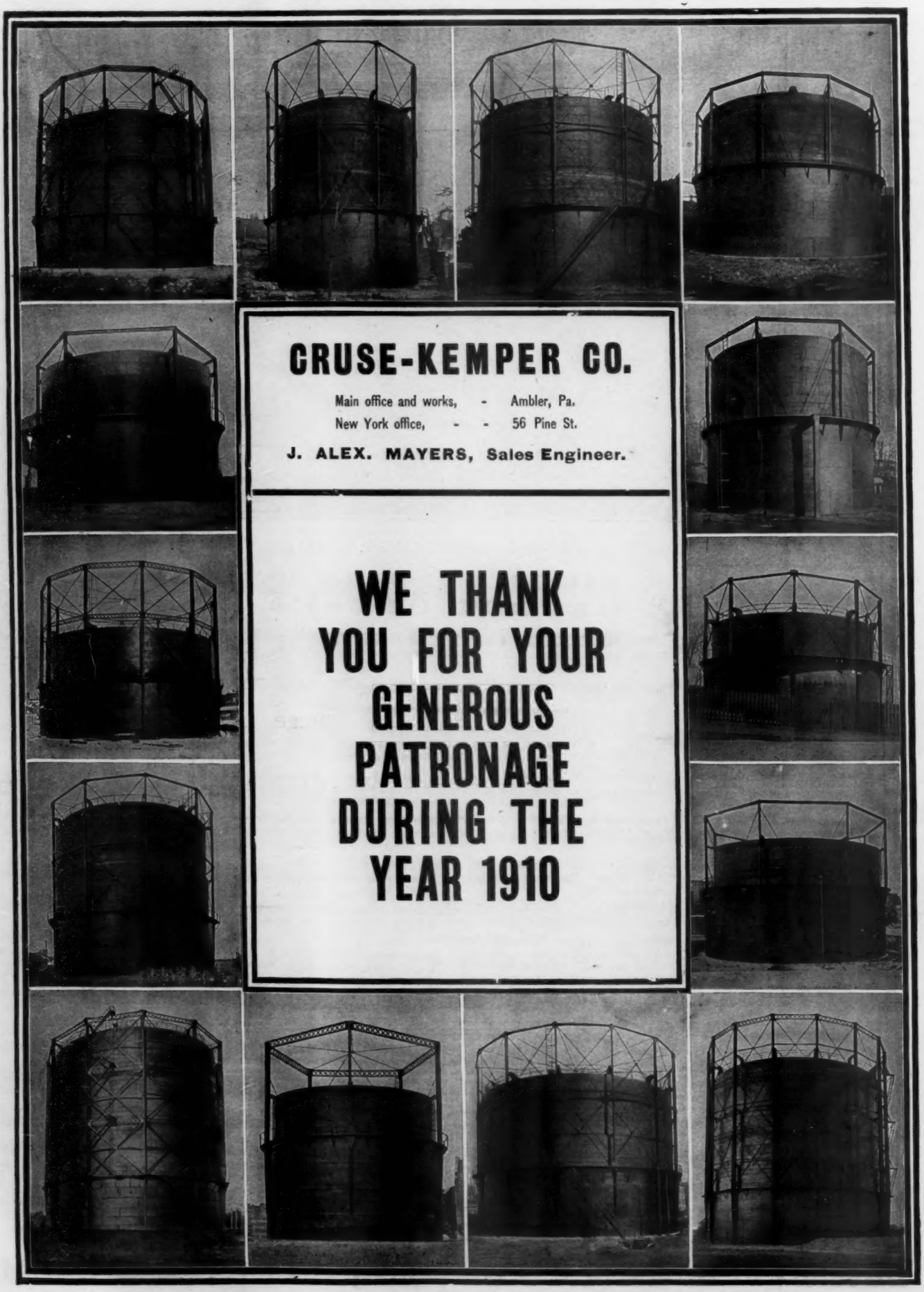
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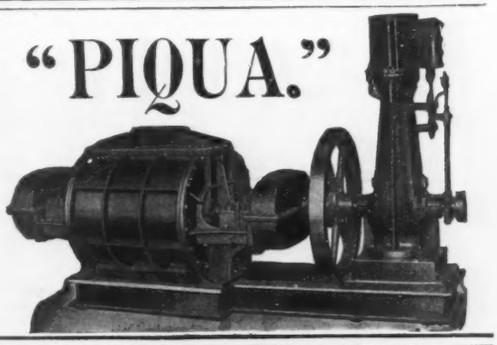

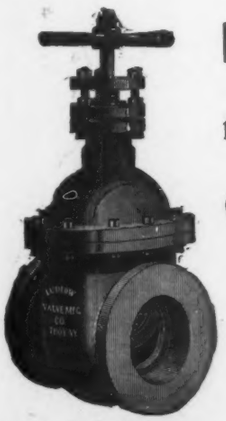

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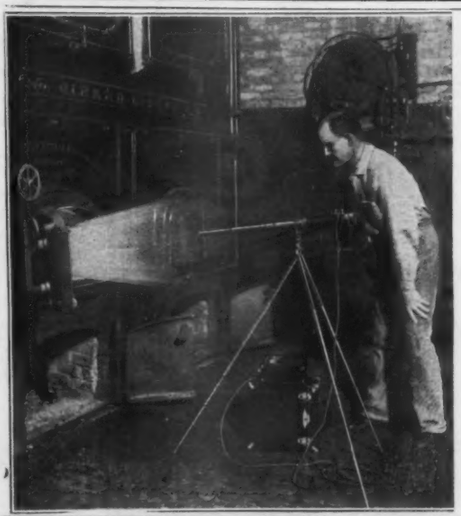

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Day of Week.	MOONLIGHT SCHEDULE.		
	Date.	Light.	Extinguish.
Sunday	1	5.20 P.M.	6.20 A.M.
Monday	2	5.20	6.20
Tuesday	3	5.20	6.20
Wednesday	4	5.20	6.20
Thursday	5	8.50	6.20
Friday	6	10.00	6.20
Saturday	7	11.10 F.Q.	6.20
Sunday	8	12.20 A.M.	6.20
Monday	9	1.30	6.20
Tuesday	10	2.50	6.20
Wednesday	11	4.10	6.20
Thursday	12	5.20	6.20
Friday	13	No L.	No L.
Saturday	14	No L. F.M.	No L.
Sunday	15	No L.	No L.
Monday	16	5.30 P.M.	8.00 P.M.
Tuesday	17	5.30	9.10
Wednesday	18	5.30	10.20
Thursday	19	5.30	11.30
Friday	20	5.30	12.30 A.M.
Saturday	21	5.30 L.Q.	1.30
Sunday	22	5.40	2.30
Monday	23	5.40	3.30
Tuesday	24	5.40	4.30
Wednesday	25	5.40	5.30
Thursday	26	5.40	6.10
Friday	27	5.40	6.10
Saturday	28	5.40	6.10
Sunday	29	5.50 N.M.	6.10
Monday	30	5.50	6.10
Tuesday	31	5.50	6.10

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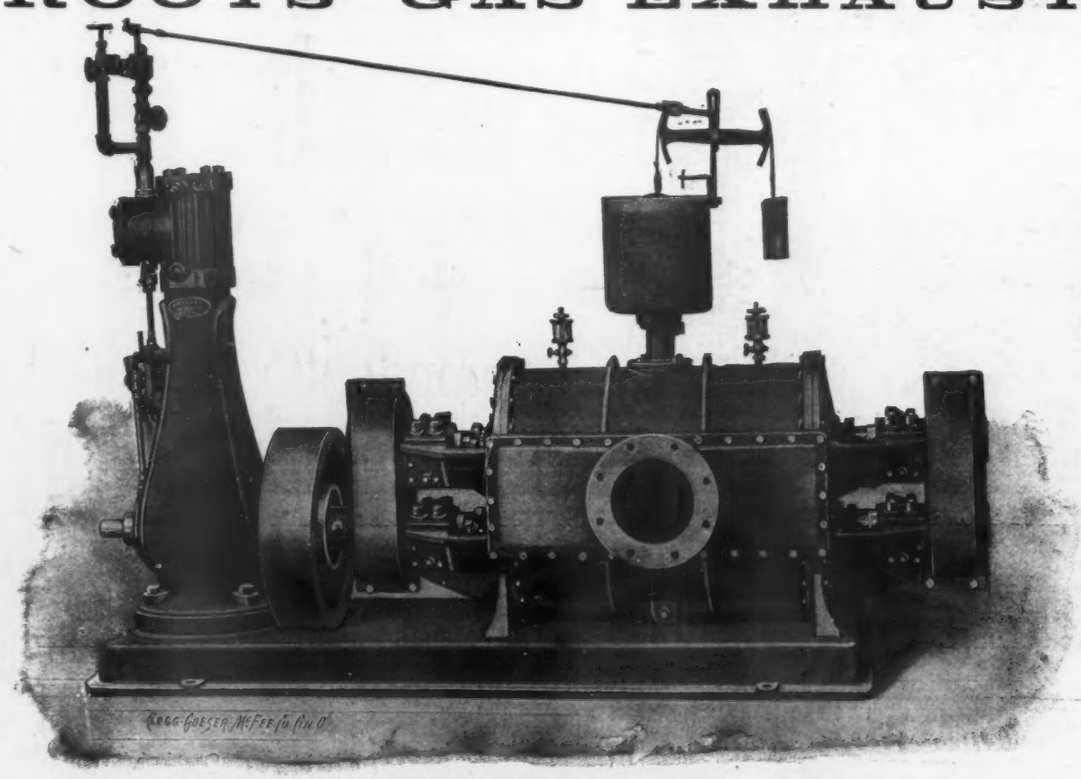

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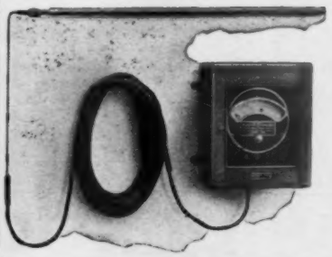

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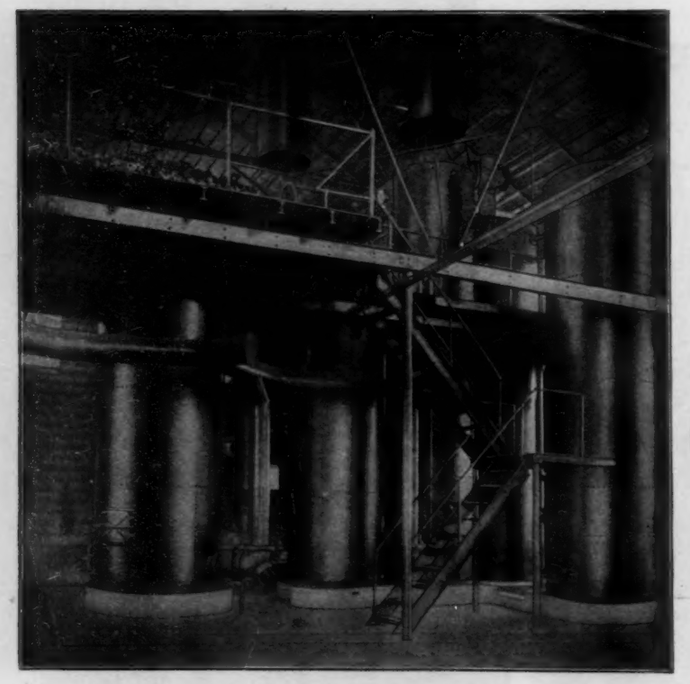

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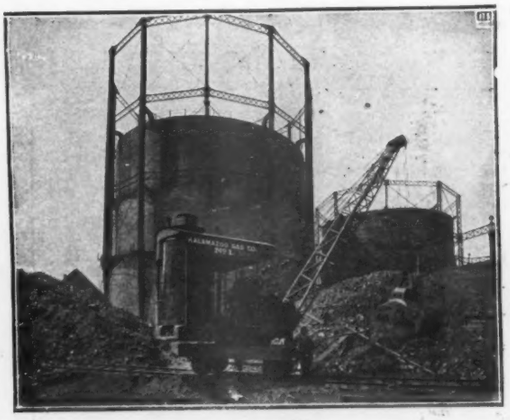

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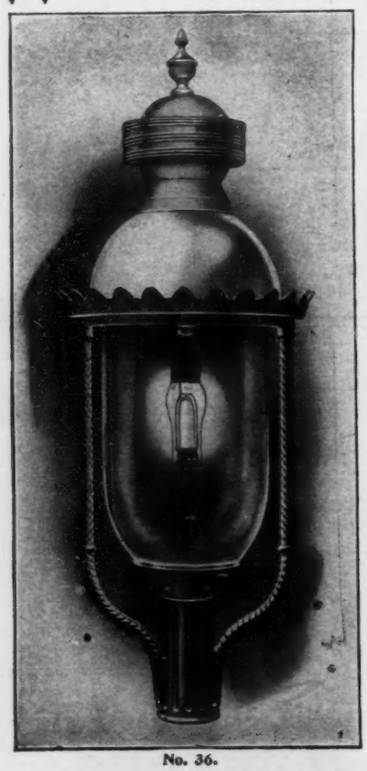

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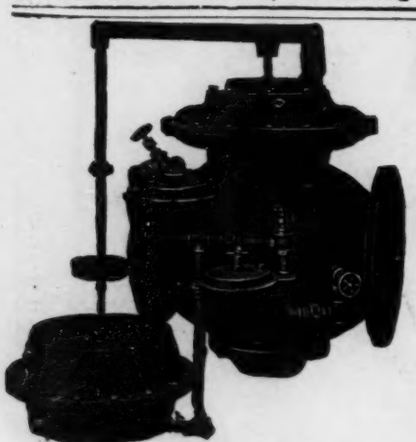

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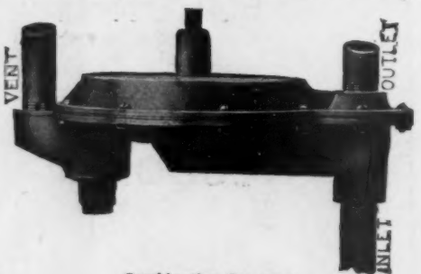

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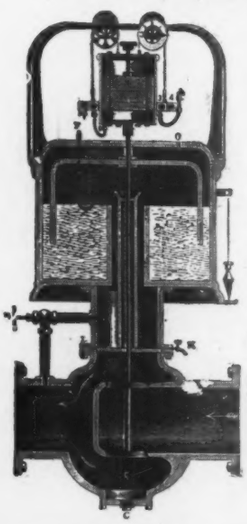

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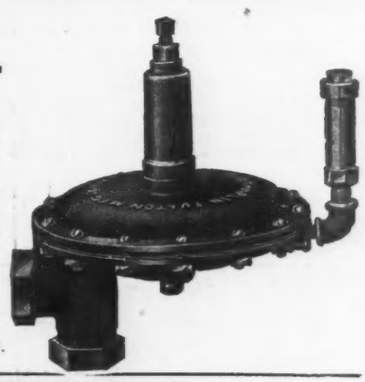

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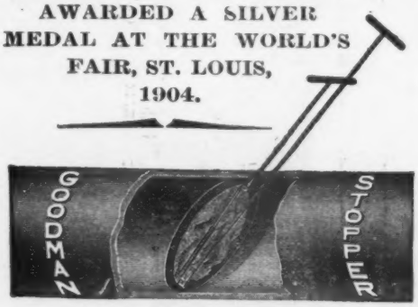

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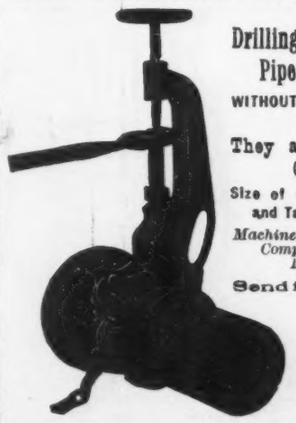

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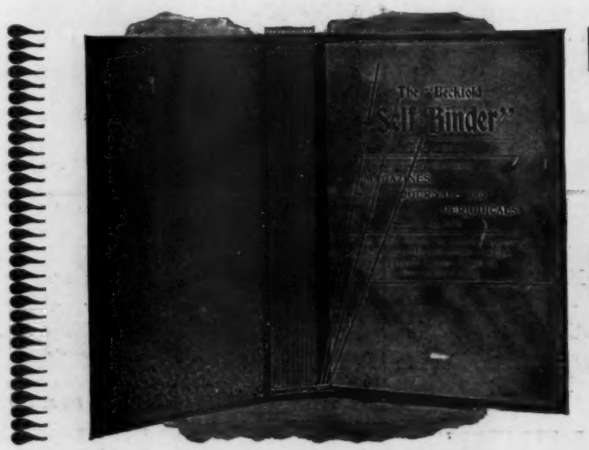

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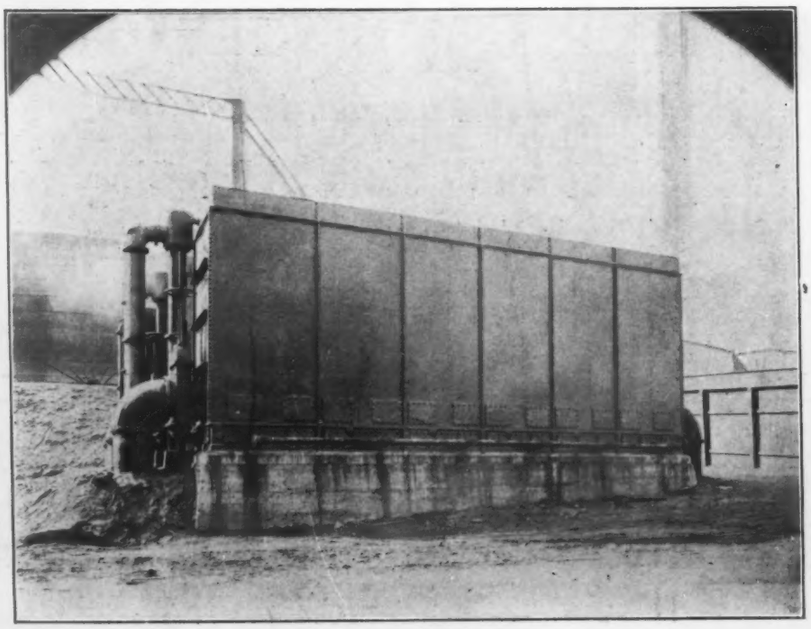

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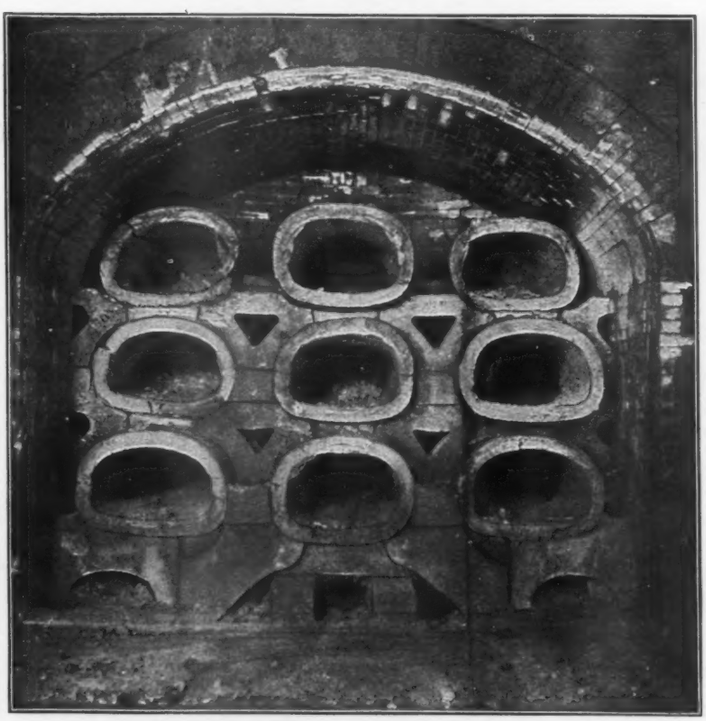

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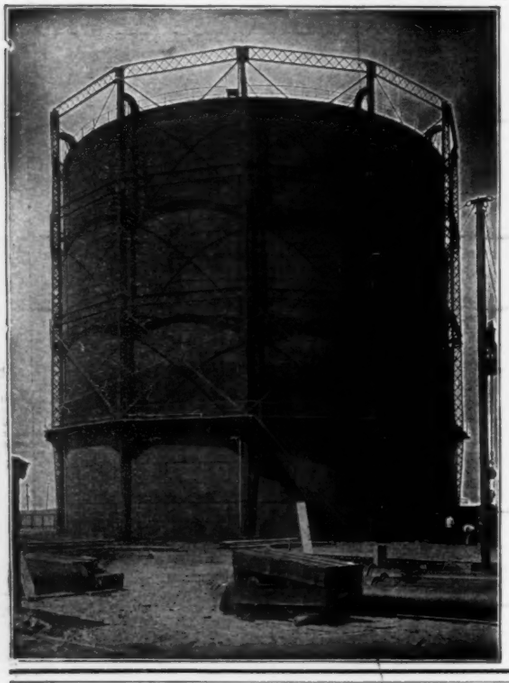

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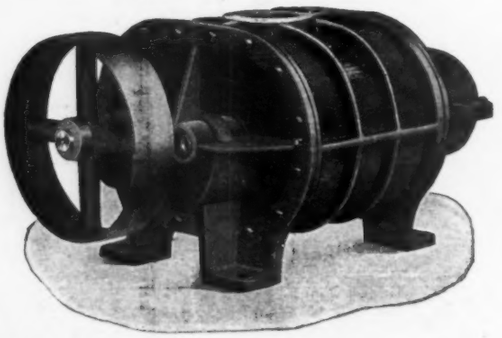

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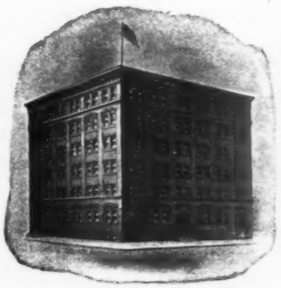

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